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JOURNAL

OF THE

ROYAL GEOGRAPHICAL SOCIETY.

VOLUME THE FORTY-THIRD.

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1873.

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Royal Geographical Society,

1873.

REPORT OF THE COUNCIL,

READ AT THE ANNIVERSARY MEETING ON THE 27TH MAY.

THE Council have to submit to the Fellows the following Report on the financial and general condition of the Society:—

Members.—During the year ending April 30, 1873, there have been elected 221 Ordinary, 1 Honorary, and 3 Honorary Corresponding Fellows, of which number 27 have paid their Life Compositions. These numbers are a considerable advance on those of the previous year (when 190 members were elected), and the increase is the largest the Society has obtained since 1864. The losses sustained by death amount to 53, of whom one was an Honorary and four were Honorary Corresponding Fellows. Thirty-two have been lost by resignation; making the net increase 140. In 1872 the net increase was 78; in 1871, 26; and in 1870, 101.

Finances.—By the balance-sheet for the financial year (January to December 1872), Appendix A, it will be seen that the net income of the Society was 6119*l.* 7*s.* 9*d.* This shows a marked increase over that of the previous year, viz., 5637*l.* 3*s.* 7*d.* The amount received from subscriptions of Members was 5070*l.* 4*s.* 9*d.*; in 1871 it was 4633*l.* 14*s.*; in 1870, 4897*l.* 10*s.*; and in 1869, 4076*l.* 10*s.*

A comparison of the expenditure side of the balance-sheet shows also an increase over that of previous years, being, in 1872, 5871*l.* 13*s.* 2*d.*, or, more correctly (deducting the outlay

on account of Congo Expedition), 5146*l.* 13*s.* 2*d.* In 1871 it was 3726*l.* 4*s.* 4*d.*, and, in 1870, 3845*l.* 10*s.* 6*d.* The amount expended in the promotion of expeditions, and the increased cost of publications, account for this increase.

The Finance Committee of Council have held, as in previous years, monthly meetings throughout the year, generally presided over by the Treasurer.

The annual Audit has been held during the present month; the auditors being,—for the Council, the Right Hon. Sir Thomas Fremantle, Bart., and Sir Charles Nicholson, Bart; for the Fellows at large, General Sir George Balfour, M.P., and H. Jones Williams, Esq. The Council take this opportunity of expressing their cordial thanks, in which they believe the whole Society will join, to these experienced gentlemen for the time and pains they have so cheerfully given to this important task.

STATEMENT showing the RECEIPTS and EXPENDITURE of the Society from the Year 1848 to the 31st Dec. 1872.

Year.	Cash Receipts within the Year.			Cash Amounts invested in Funds.			Deducting Amounts invested in Funds; actual Expenditure.		
	£.	s.	d.	£.	s.	d.	£.	s.	d.
1848	696	10	5	..	..		755	6	1
1849	778	3	0	..	..		1098	7	6
1850	1036	10	5	..	..		877	2	10
1851	1056	11	8	..	..		906	14	7
1852	1220	3	4	..	..		995	13	1
1853	1917	2	6	..	..		1675	6	0
1854	2565	7	8	..	..		2197	19	3
1855	2584	7	0	..	..		2636	3	1
1856	3372	5	1	533	10	0	2814	8	1
1857	3142	13	4	378	0	0	3480	19	9
1858	3089	15	1	..	..		2944	13	6
1859	3471	11	8	950	0	0	3423	3	9
1860	6449	12	1	466	17	6	5406	3	7
1861	4792	12	9	1358	2	6	3074	7	4
1862	4659	7	9	1389	7	6	3095	19	4
1863	5256	9	3	1837	10	0	3655	4	0
1864	4977	8	6	1796	5	0	3647	7	10
1865	4905	8	3	1041	5	0	4307	4	5
1866	5085	8	3	1028	15	0	4052	15	0
1867	5462	7	11	1029	0	6	3943	17	4
1868	5991	4	0	1857	3	9	4156	17	10
1869	6859	16	0	2131	5	0	4646	0	8
1870	8042	6	1	3802	6	0	3845	10	6
1871	6637	3	7	1000	0	0	3726	4	4
1872	8119	7	9	1999	4	6	5871	13	2

In 1856 a Treasury Grant of 1000*l.* for the East African Expedition received.

In 1860 a Treasury Grant of 2500*l.* for the East African Expedition received.

In 1869 Legacy of Mr. Benjamin Oliveira, 1506*l.* 17*s.* 1*d.*

In 1870 Legacy of Mr. Alfred Davis, 1800*l.*

In 1871 Legacy of Sir Roderick Murchison, 1000*l.*

In 1872 Amount of Mr. James Young's Grant for the Livingstone Congo Expedition, 2000*l.*

STATEMENT showing the Progress of the INVESTMENTS of the Society from the Year 1832 to the 31st Dec. 1872.

End of the Year, Dec. 31.	Cash invested.			Amount of Stock.		
	£.	s.	d.	£.	s.	d.
1832	3657	10	0	4000	0	0
1833	4130	0	0	4500	0	0
1834	4426	0	0	4800	0	0
1835	4426	0	0	4800	0	0
1836	4426	0	0	4800	0	0
1837	4426	0	0	4800	0	0
1838	4426	0	0	4800	0	0
1839	4129	15	0	4500	0	0
1840	3788	16	0	4150	0	0
1841	2801	0	0	3150	0	0
1842	2801	0	0	3150	0	0
1843	2219	18	6	2578	4	4
1844	2219	18	6	2578	4	4
1845	2219	18	6	2578	4	4
1846	1933	1	0	2278	4	4
1847	2133	1	0	2502	6	2
1848	1886	16	8	2224	1	10
1849	1886	16	8	2224	1	10
1850	1886	16	8	2224	1	10
1851	1886	16	8	2224	1	10
1852	1886	16	8	2224	1	10
1853	1662	14	10	2000	0	0
1854	1662	14	10	2000	0	0
1855	1662	14	10	2000	0	0
1856	2216	4	10	2600	0	0
1857	2594	4	10	3000	0	0
1858	2594	4	10	3000	0	0
1859	3544	4	10	4000	0	0
1860	4011	2	4	4500	0	0
1861	5369	4	10	6000	0	0
1862	6758	12	4	7500	0	0
1863	8596	2	4	9500	0	0
1864	10365	7	4	11500	0	0
1865	11406	12	4	12500	0	0
1866	12435	7	4	13500	0	0
1867	13464	7	10	14500	0	0
1868	15321	11	7	16250	0	0
1869	17452	16	7	18250	0	0
1870	19250	0	0	6700	0	0
1871	20250	0	0	4700	0	0
1872	22249	4	6	6700	0	0

ASSET ACCOUNT.

	£.	s.	d.
Freehold House, Fittings, and Furniture, estimated (exclusive of Map Collections and Library) ..	20,000	0	0
Funded property	6,700	0	0
Total	£26,700	0	0

Livingstone Aid Expeditions.—As the Fellows have been informed by the Reports, published from time to time in the 'Proceedings,' there are at present two Expeditions on foot under the management of the Society, endeavouring to carry supplies to, and co-operate with, Dr. Livingstone. The expenses of one of these Expeditions—the "Livingstone East Coast Expedition," are borne by the Livingstone Search and Relief Fund, which was raised by public subscription in the early part of the year 1872. This fund is treated as an account separate from the general finances of the Society. The Council have to report that the total amount subscribed was 5388*l.* 6*s.* 11*d.*; and that, after the payment of all the liabilities incurred by the first Expedition under Lieut. Dawson, a balance remained of 3175*l.* 16*s.* 6*d.* The new Expedition, under Lieut. Cameron, was augmented, with the approval of Sir Bartle Frere, by two persons since it left England, and its expenses have been greater than was originally anticipated, but it is believed that, after all the cost of finally equipping and starting it for the interior has been defrayed, there will be a balance of about 300*l.* reserved towards the expenses of its return to England. The statements of accounts recently received from Zanzibar are at present under examination by a professional accountant.

The means for the support of the "Livingstone Congo Expedition" were provided by the munificence of Mr. J. Young, of Kelly, to the extent of 2000*l.*, and the account is not treated separately from the general affairs of the Society. The whole of the sum was expended in the outfit, passage, and final equipment of the Expedition, which left the coast for the interior in March last.

Publications.—The 42nd volume of the 'Journal,' which is of much larger size than usual, is nearly ready for delivery. The 16th volume of the 'Proceedings' has been completed during the winter, and Parts 1 and 2 of Volume XVII. issued, or ready for issue, to the Fellows.

The great interest excited by the recent discoveries of Dr. Livingstone in Central Africa, along the course of the River Lualaba, has induced the Council to publish a volume of translations of the narratives of various Portuguese travellers in the same regions; particularly the remarkable journey of

Dr. Lacerda, near the close of the last century. Lacerda's narrative, which forms the bulk of the volume, has been translated by Captain R. F. Burton, who has also revised the other portions. This volume, bound in similar style to the 'Journal,' will be issued on the same terms to the Fellows, namely, gratis, on their applying at the Society's office.

Library.—1043 volumes of books and pamphlets have been added to the library during the year: 27 only were obtained by purchase, the rest being donations or exchanges.

Among the more important additions are—a costly volume of photographs of California, presented by Mr. Watkins, of San Francisco, and Mr. J. H. M'Clure, of Manchester; 'The Botany of the Speke and Grant Expedition,' presented by Colonel Grant; the second volume of the superb monograph on the Balearic Islands, entitled 'Die Balearen in Wort und Bild,' presented by the anonymous author; the two handsome volumes of the Italian geographical work by Visconti Giammartino, entitled 'Diarie di un Viaggio in Arabia Petrea,' &c.; the 'Journal of the Museum Godeffroy;' the copiously illustrated work on 'The Great French Cambodian and China Expedition,' by our Medallist, Lieut. F. Garnier; extensive series of photographs of the Rocky Mountains, presented by Professor Hayden, Official Geologist of the United States.

The library continues to be consulted by private students and officers of the public departments. The Library Committee of Council has held occasional meetings, and superintended the Librarian's work. The Committee are glad to report that a new Catalogue for entering press marks and additions is nearly ready for use, and hope that the whole of the books will soon be duly entered and more available for prompt reference than they have hitherto been.

Map-Room.—The total accessions to the Map Collection since the last anniversary have been 633 Maps on 3522 sheets (of these, 514 maps on 2421 sheets are by presentation, and 119 maps on 1101 sheets are by purchase), 18 Atlases, and 10 Diagrams. The maps by purchase consist chiefly of those on large scales, published in Germany, Austria, Russia, Italy, Belgium, Holland, &c., on which 128*l.* has been expended.

The following are the principal accessions:—

667 Ordnance Sheets of the Survey of Great Britain and Ireland. Presented by the Secretary of State for War, through Sir H. James, R.E., Director.

394 Sheets of the Indian Survey. Presented by the India Office, through Colonel H. C. Thuillier, Surveyor-General of India.

69 Sheets of Admiralty Charts. Presented by the Lords Commissioners of the Admiralty, through Admiral G. H. Richards, C.B., Hydrographer.

72 Sheets of French Charts. Presented by the Dépôt de la Marine.

38 Sheets of Danish Charts.

261 Sheets of Austrian Surveys.

15 Sheets of the Belgian Surveys.

27 Sheets of the Danish Surveys.

245 Sheets of the French Government Maps.

70 Sheets of the German Surveys.

120 Sheets of the Dutch Surveys.

48 Sheets of the Italian Surveys.

15 Sheets of the Portuguese Surveys.

12 Sheets of the Russian Surveys.

14 Sheets of the Spanish Surveys. By Coello, in duplicate.

66 Sheets of the Swedish Surveys.

48 Sheets of the Surveys of Switzerland.

38 Sheets of the United States' Surveys.

45 Chinese Maps, the collection of William Lockhart, Esq., and R. Morrison, Esq. Presented by them.

30 Ancient Maps of Europe, from the Christy Collection. Presented by A. W. Franks, Esq.

4 Sheets, Lithologie du fond des Mers. Presented by M. Delesse.

Parts 1 and 2 of the Biblical and Classical Atlas, by Dr. W. Smith and G. Grove, Esq. Presented by J. Murray, Esq.

7 Sheets of the Harbour of Colombo—proposed improvements. Presented by H. W. Bristow, Director of Geological Survey.

Numerous Maps by Dr. A. Petermann, from the 'Mittheilungen.'

Grants to Travellers.—The sum of 67*l.* 17*s.* 11*d.* has been expended in the purchase of instruments for the East Coast Expedition, under Lieut. V. L. Cameron, R.N.; and a sum of 123*l.* 11*s.* 4*d.* for the purchase of instruments for Lieut. W. J. Grandy, R.N., of the Livingstone Congo Exploration. 100*l.* was granted to Dr. Dillon, second in command to Lieut. Cameron, towards the expenses of his outfit, and a further sum of 10*l.* 10*s.* has been expended for Meteorological instruments deposited at the Consulate, Zanzibar, as standards of reference for the African Exploring Expeditions. The 500*l.* subscribed to the Livingstone Search Relief Fund, in January 1872, comes also in the past year's account. The total amount contributed by the Society to the various Livingstone Search Expeditions (besides the value of instruments taken from store) has been 801*l.* 19*s.* 3*d.*

APPENDIX A.

BALANCE-SHEET FOR THE YEAR 1872.

Receipts.

1872.	£. s. d.	£. s. d.
Balance in Bankers' hands 31st Dec. 1871	703 16 3	
Ditto Accountant's Ditto	6 5 5	
		710 1 8
Subscriptions of 1635 Fellows	3269 2 9	
Entrance Fees of 200 Ditto	600 0 0	
Life Compositions of 32 Ditto	798 0 0	
Arrears of Subscriptions	403 2 0	
		5070 4 9
Parliamentary Grant	.. ..	500 0 0
Royal Premium	.. ..	52 10 0
Rent of Vaults	.. ..	150 0 0
Sale of Publications	.. ..	129 19 10
Advertisements	.. ..	8 11 0
Half Year's Dividend on 900*l.* Great Indian Peninsula Railway Stock	21 18 9	
Half Year's Dividend on 1000*l.* India 5 per Cent.	24 7 6	
Half Year's Dividend on 1800*l.* Great Western Railway 4½ Debenture Stock	37 5 10	
Half Year's Dividend on 1000*l.* London and North-Western Railway 4 per Cent. Debenture Stock (from 15th December, 1871)	3 6 3	
Half Year's Dividend on 1000*l.* North-Eastern Railway 4 per Cent. Debenture Stock (from 25th April 1872)	7 2 3	
Half Year's Dividend on 900*l.* Great Indian Peninsula Railway Stock	22 2 6	
Half Year's Dividend on 1000*l.* India 5 per Cents.	24 11 8	
Half Year's Dividend on 1800*l.* Great Western Railway 4½ Debenture Stock	37 9 1	
Half Year's Dividend on 1000*l.* London and North Western Railway 4 per Cent. Debenture Stock	19 11 8	
		197 15 6
Amount of Mr. James Young's grant for the Livingstone Congo Expedition	.. ..	2000 0 0
Miscellaneous	.. ..	10 6 8
		£8829 9 5

Expenditure.

1872.	£. s. d.	£. s. d.
Taxes, House Expenses, &c.	.. ..	108 11 5
Salaries and Wages	.. ..	1511 15 8
Library and Map-Room	.. ..	186 8 0
Subscriptions, &c., returned	.. ..	51 0 0
Gold Medals, School Prizes, and other awards	.. ..	194 2 0
Postages, &c.	.. ..	179 7 7
Office Expenses	.. ..	439 12 6
Publications, Illustrations, &c. ..	.. ..	1513 3 6
Expeditions:—		
Contribution to the Livingstone Search and Relief Expedition ..	500 0 0	
Expenditure for Instruments on account of Livingstone East Coast and Congo Expeditions	291 9 3	
Do. do. Livingstone Congo Expedition	725 0 0	
Meteorological Instruments for deposit at the Zanzibar Consulate	10 10 0	
		1526 19 3
Furniture and Repairs	.. ..	86 17 1
Miscellaneous	.. ..	73 16 2
		5871 13 2
Stock Purchased:—		
1000*l.* North-Eastern Railway Debenture Stock	1000 0 0	
1000*l.* Exchequer Bills	999 4 6	
		1999 4 6
Balance in Bankers' hands .. .. .. (£. s. d. 1035 17 9)		
Less Cheque not presented .. .. .. (89 16 1)		
	946 1 8	
Balance in Accountant's hands ..	12 10 1	
		958 11 9
		£8829 9 5

APPENDIX B.

ESTIMATE FOR THE YEAR 1873.

Receipts.

	£.	s.	d.
Cash Balance	958	11	9
Annual Subscriptions	3500	0	0
Life Compositions	650	0	0
Entrance Fees	500	0	0
Arrears of Subscriptions	300	0	0
Royal Premium	52	10	0
Parliamentary Grant	500	0	0
Sale of Publications, Advertisements, &c.	130	0	0
Dividends and Small Receipts	300	0	0
Rent of Vaults	150	0	0
	£7041	1	9

Expenditure.

	£.	s.	d.
Taxes and House Expenses	120	0	0
Salaries and Wages	1750	0	0
Library and Map-Room	400	0	0
Gold Medals and other Awards, including Murchison Fund	200	0	0
Postages, &c.	150	0	0
Office Expenses	370	0	0
Journal and Proceedings	1400	0	0
Furniture and Repairs	100	0	0
	4490	0	0
Balance	2551	1	9
	£7041	1	9

Library Regulations.

I. The Library and Map Room will be open every day in the week (Sundays excepted) from 10·30 in the morning to 4·30 in the afternoon,* except Good Friday, Easter Monday, Christmas Day and the day following; and it will be closed during the third week in September, in order to be thoroughly cleaned.

II. Every Fellow of the Society is entitled (*subject to the Rules*) to borrow as many as four volumes at one time.

Exceptions :—

1. Dictionaries, Encyclopædias, and other works of reference and cost, Minute Books, Manuscripts, Atlases, Books and Illustrations in loose sheets, Drawings, Prints, and unbound Numbers of Periodical Works, *unless with the special written order of the President.*
2. Maps or Charts, *unless by special sanction of the President and Council.*
3. New Works before the expiration of a year after reception.

III. The title of every Book, Pamphlet, Map, or Work of any kind lent, shall first be entered in the Library-register, with the borrower's signature, unless applied for by a separate note in his hand.

IV. No work of any kind can be retained longer than one month: but at the expiration of that period, or sooner, the same must be returned free of expense, and may then, upon *re-entry*, be again borrowed, provided that no application for it shall have been made in the mean time by any other Fellow.

V. In all cases a list of the Books, &c., or other property of the Society, in the possession of any Fellow, shall be sent in to the Assistant Secretary *on or before the 1st of July in each year.*

VI. In every case of loss or damage to any volume, or other property of the Society, the borrower shall make good the same; and all or any property shall be considered as lost, and recovery of its value be capable of being enforced, which is not returned within four months after application for it.

VII. No stranger can be admitted to the Library except by the introduction of a Fellow, whose name, together with that of the Visitor, shall be inserted in a book kept for that purpose.

VIII. Fellows transgressing any of the above Regulations will be reported by the Secretary to the Council, who will take such steps as the case may require.

By Order of the Council.

* On Saturday the Library is closed at 2·30 P.M.

ROYAL GEOGRAPHICAL SOCIETY.

Patron.

HER MAJESTY THE QUEEN.

Vice-Patron.

H.R.H. THE PRINCE OF WALES.

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(ELECTED 26TH MAY, 1873.)

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VERNEY, Major Sir Harry C., Bart.
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Assistant Secretary and Editor of Transactions.—H. W. BATES, Esq.

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March, 1874.

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H.M. Victor Emmanuel II., King of Italy.
H.M. Leopold II., King of the Belgians.
H.I.H. the Grand Duke Constantine, President of the Imperial Geographical Society of St. Petersburg.
H.R.H. the Duke of Edinburgh.
H.I.H. Ismail Pasha, Viceroy of Egypt.
H.H. Syed Barghash Ibn Syed Säid, Sultan of Zanzibar.
H. M. Oscar II., King of Sweden and Norway.

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Abich, Dr. William Hermann, St. Petersburg
Almeida, Dr. Candido Mendes de.
Baer, Chev. de K. E., Mem. Imp. Acad. of Science .. .. .. St. Petersburg
Balbi, M. Eugène de .. .. .. Milan
Bastian, Dr. Adolph .. .. .. Bremen
Berghaus, Prof. Heinrich .. .. Berlin
Burmeister, Dr. Hermann, Buenos Ayres
Chaix, Prof. Paul .. .. .. Geneva
Coello, Don Francisco .. .. Madrid
Cora, Signor Guido, 17 Via Providenza, Turin
Dana, Professor James D., New Haven, Connecticut
D'Avezac, M.. .. .. Paris
Dufour, Gen., Director of the Topo. Depart., Switzerland .. .. .. Geneva
Duveyrier, M. Henri .. .. Paris
Ehrenberg, C. P., For. M.R. and L.S., Berlin
Erman, Prof. Adolph .. .. .. Berlin
Faidherbe, Genéral L. .. .. France
Figaniére, Command. Jorgé César, Lisbon
Forchhammer, Prof. P. W. .. .. Kiel
Fremont, General .. .. .. New York
Grinnell, Henry, Esq. V.P. Geogr. Soc. of.. .. .. New York
Guyot, Prof., LL.D., Princeton, New Jersey
Hauslab, General .. .. .. Vienna
Helmersen, Col. P. .. St. Petersburg
Hochstetter, Dr. Ferdinand von, Pres. Imp. Geograph. Soc. of .. .. Vienna
Horner, Le Père
Irminger, Rear-Admiral C. L. C., R.D.N. Copenhagen
Jansen, Captain M. H., D.R.N., Delft, Holland
Jochmus, Field Marshal Lieutenant Baron, Vienna
Kennelly, D. J. Esq., F.R.A.S.
Khanikof, M. .. .. Paris
Kiepert, Dr. H. .. .. Berlin
Leal, José da Silva Mendes, Minister of the Colonies .. .. Lisbon
Linant Pasha .. .. .. Alexandria
Lutke, Admiral F. B., Pres. of the Imp. Academy of Sciences .. St. Petersburg
Madoz, Don Pascual .. .. .. Madrid
Malte-Brun, M. V. A., Hon. Sec. Geogr. Soc. of.. .. .. Paris
Mirza Malcom Khan, His Excellency, (Persian Minister).
Munzinger, Werner, Esq., C.B.
Nardi, Monsignor Francesco .. Rome
Negri, Chevalier Cristoforo .. .. Turin
Osten Sacken, Baron .. St. Petersburg
Pardo, His Excellency Don Manuel (Pres. Republic of Peru) .. .. .. Lima
Petermann, Dr. Augustus .. .. Gotha
Philippi, Dr. Rodulfo Armando .. Chili
Platen, His Excellency Count.
Raimondy, Don Antonio.. .. .. Lima
Ranuzzi, Count Annibale .. .. Bologna
Richthofen, Baron von, (Pres. Berlin Geog. Soc.), 71 Steglitzer Strasse, Berlin
Rüppell, Dr. E., For. M.L.S. .. Frankfort
Sa' da Bandeira, The Marquez de, Lisbon

SALAS, Don Saturnino, Pres. Topo. Depart., Argentine Repub. .. .. Buenos Ayres

SCHEDA, Herr von, Director of the Imp. Inst. of Military Geogr. .. .. Vienna

SCHERZER, Dr. Karl von .. .. Vienna

SOLDAN, Don Mariano Felipe Paz Lima

SONKLAR, Lieut.-Col. the Chev. de, Wiener Neustadt, Vienna

STRUVE, Prof. Otto, Imp. Observ. of Pulkowa .. .. .. St. Petersburg

TCHIHATCHEF, M. Pierre de, 1 Piazza deyli Zuave .. ..Florence

TSCHUDI, Herr T. T. von .. .. Vienna

VÁMBÉRY, Professor Arminius .. Pesth

VASCONCELLOS É SILVA, Dr. Alfredo Casimiro de .. .. .. Rio de Janeiro

VILLAVICENCIO, Don Manuel Guayaquil

WHITNEY, J. D., Esq. (State Geologist for California), Cambridge, Massachusetts, U.S.

WILCZEK, Count .. .. .. Vienna

WRANGELL, Adm. Baron .. St. Petersburg

ZIEGLER, M. J. M. .. .. Winterthur

FELLOWS.

(March, 1874.)

N.B.—*Those having * preceding their names have compounded for life.*

Year of Election	
1868	*Abbott, Wm. S. D., Esq. 28, *Pembridge-crescent*, W.
1863	Abdy, Rev. Albert, M.A. *Broad-street, Stamford; and United University Club, S.W.*.
1859	Aberdare, Hy. A. Bruce, Lord. 1, *Queen's-gate, S.W.; and Duffryn, Aberdare, Glamorganshire.*
1851	Abinger, W. F. Scarlett, Lord. *Guards' Club, S.W.*
1865	Acheson, Frederick, Esq., C.E. *Wooden Bridge, Co. Wicklow.*
1861	Acland, J. Barton Arundel, Esq. *Mount Peel, Canterbury, New Zealand. Care of A. Mills, Esq., 34, Hyde-park-gardens, W.*
1872	Acland, Dr. Henry, F.R.S., D.C.L., M.D. *Oxford.*
1873	Adams, Fras. O., Esq. (Secretary of Embassy). *Berlin.*
1872	Adams, W. J., Esq. *The Cedars, Mortlake-road, Richmond.*
1872	10 Addison, Colonel Hy. R. (Portuguese V.-Consul). 39, *Westbourne-park-villas, W.*
1862	Addison, Colonel Thomas, C.B.
1873	Adkins, Thomas, Esq. *H.M. Consul at Newchwang, China.*
1859	Ainslie, Colonel H. Francis. *Burlington-chambers, 180, Piccadilly, W.; and United Service Club, S.W.*
1830	*Ainsworth, W. F., Esq., F.S.A. *Ravenscourt-villa, New-road, Hammersmith, W.*
1859	Airlie, David Graham, Earl of. *Holly-lodge, Kensington, W.*
1860	Aitchison, David, Esq. 5, *Pembridge-square, Bayswater, W.*
1873	Aitken, Russell, Esq. 36, *Great George-street, S.W.*
1830	*Albemarle, George Thomas, Earl of. 11, *Grosvenor-square, W.; Quiddenham-hall, Larlingford, Norfolk; and Elvedon-hall, Suffolk.*
1862	Alcock, Sir Rutherford, K.C.B., D.C.L. 14, *Great Queen-street, Westminster, S.W.; and Athenæum Club, S.W.*
1838	20*Aldam, William, Esq. *Frickley-hall, near Doncaster.*
1865	Aldom, Joseph R. Esq., M.A., PH. DR. *Salway-house, Leyton, Essex.*
1857	Aldrich, Captain Robert D., R.N. *Windmill-road, Croydon, Surrey, S.*
1830	Alexander, General Sir Jas. Ed., K.C.L.S., F.R.A.S., F.R.S.E., &c. 14th Regt. *United Service Club, S.W.; and Westerton-house, Bridge of Allan, N.B.*
1873	Alexander, Wm., Esq. *Care of W. T. Alexander, Esq., Reeves villa, St. Mary Church, Devon.*
1870	Alford, Lewis, Esq. 2, *Little Love-lane, E.C.*

Year of Election.	
1873	Alforth, C. E., Esq. 4, *Elgin-road, Notting-hill, W.*
1864	Allan, C. H., Esq. 104, *Albion-road, Stoke Newington, N.*
1857	Allan, G. W., Esq. *Moss Park, Toronto, Canada. Care of Major Aylmer,* 50, *Jermyn-street, W.*
1858	Allan, James, Esq. 122, *Leadenhall-street, E.C.*
1871	30*Allcroft, John D., Esq. 55, *Porchester-terrace, W.; Harlington, Middlesex; and Stokesay, Shropshire.*
1865	Allen, James Pearce, Esq. 13, *Waterloo-place, S.W.*
1873	Allen, John Seymour, Esq. *Crepelly, Pembroke; and Balliol-college, Oxford.*
1873	Allen, Thos. B., Esq. 46, *Regent's-park-road, N.W.*
1874	Altschul, Dr., M.A., M.S.A., M. Philol. Soc., &c. 9, *Old Bond-street, W.*
1872	Amstel, Jonkheer J. W. Roos Van, Esq. (Knight of the Order of the Netherland Lion, and His Netherland Majesty's Con.-Gen. for the Australian Colonies and New Zealand). *Melbourne; Amsterdam.*
1854	Ancona, J. S., Esq. 8, *John-street, Adelphi, W.C.*
1867	Anderson, Sir Henry L., K.C.S.I. *India-office, S.W.*
1871	Anderson, Sir James. 16, *Warrington-crescent, W.*
1862	Anderson, James, Esq. 1, *Billiter-court, City, E.C.*
1861	40 Anderson, John, Esq., *Reform Club, Pall-mall, S.W.*
1871	Anderson, Sir Wm. Geo., K.C.B. 1, *Buckingham-gate, S.W.*
1873	Anderson, Colonel W. W.
1870	Anderson, William Jas., Esq. *Sans Souci, Newlands, near Cape Town, Cape of Good Hope.*
1856	*Andrew, William P., Esq. 29, *Bryanston-square, W.*
1867	Andrews, G. H., Esq. *The Cedars, New Brentford.*
1866	Andrews, John R., Esq. 14, *Bryanston-square, W.*
1868	Angas, George F., Esq. 48, *Norland-square, Holland-park, W.*
1861	Annesley, Colonel the Hon. Hugh. 25, *Norfolk-street, Park-lane, W.*
1872	Ansell, Maurice, Esq. 14, *Clifton-gardens, Maida-hill, W.*
1853	50 Ansted, Prof. D. T., M.A., F.R.S., &c. 33, *Brunswick-square, W.C.; Athenæum Club, S.W.; and Château Vieux, St. Léonard, Boulogne-sur-Mer.*
1873	Anstey, George A., Esq. *Windham Club, S.W.*
1857	Anstruther, Major-General Philip, C.B., Madras Artillery. *Airth-castle, by Falkirk, N.B.*
1864	Anstruther, Capt. R. L., Rifle Brigade. *Blue Gate, Ipswich.*
1858	Arbuthnot, George, Esq. 23, *Hyde-park-gardens, W.*
1862	Arbuthnot, Major George, R.H.A. *Cowarth, Sunningdale.*
1872	Archibald, Wm. Fredk. A., Esq. 3, *Amersham-road, Putney, S.W.*
1866	*Arconati, The Marquis Giammartino. *Casa Prini, Pisa. Care of Messrs. Bocca, Bros., Turin. Per Messrs. Barthes and Lowell, Great Marlborough-street, W.*
1870	Ardagh, Capt. John C., R.E. *Staff College, Farnboro' Station, Hants.*
1855	*Arden, Richard Edward, Esq. *East Burnham-house, Buckinghamshire.*
1858	60*Armistead, Rev. Charles John, M.A., F.S.A., *United University Club, S.W.*

Year of Election.	
1863	Armitage, Edward, Esq. 3, *Hall-road, St. John's-wood, N. W.*
1867	*Armitstead, George, Esq., M.P. *Errol-park, Errol, N.B.*
1857	Armstrong, Sir Alexander, K.C.B., L.L.D., F.R.S., Director-General of the Navy Medical Department. *Admiralty, Somerset-house, W.C.; and Junior United Service Club, S. W.*
1871	Arrow, Sir Fred. *Trinity-house, Tower-hill, E.C.; and Pilgrim's-hall, Brentwood, Essex.*
1873	Arthur, Colonel Sir Frederick, Bart. 24, *Queen's-gate, South Kensington, W.*
1863	Arthur, Captain William, R.N. *The Priory, Leatherhead.*
1872	Artingstall, M. Geo., Esq., J.P. *Latchford-house, Warrington.*
1869	Ashbee, Edmund Wm., Esq., F.G.S. 17, *Mornington-crescent, Regent's-park, N. W.*
1873	*Ashton, Captain Samuel Tudor. 7, *Palmeira-square, Brighton.*
1870	70*Ashton, Charles, Esq. *Maplewell, Loughborough.*
1864	*Ashton, R. J., Esq. *Hatton-court, Threadneedle-street, E.C.*
1853	*Ashwell, James, Esq., M.A., F.G.S.
1830	*Atkins, John Pelly, Esq., F.S.A. *Halsted-place, near Sevenoaks.*
1870	Atkinson, William, Esq., F.L.S. &c. 47, *Gordon-square, W.C.*
1869	Atlee, Charles, Esq. *The Park, Ealing, W.*
1860	Attwell, Professor Henry. *Barnes, S. W.*
1859	Austen, Major Henry H. Godwin, 24th Foot, Trig. Survey, Punjaub. *Junior United Service Club, S. W.; and Chilworth-manor, Guildford, Surrey.*
1863	Austin, John G., Esq. *Care of the Colonial Company*, 16, *Leadenhall-street, E.C.*
1854	Ayrton, Right Honourable Acton S. 11, *Bolton-street, Piccadilly.*
1866	80*Babington, William, Esq., *St. Kilda, Buckhurst-hill, Essex; and Bonny River West Coast of Africa.*
1836	*Back, Admiral Sir Geo., D.C.L., F.R.S. 109, *Gloucester-place, Portman-sq., W.*
1866	Bacon, Geo. Washington, Esq. 127, *Strand, W.C.*
1873	Baden-Powell, Henry W. S., Esq. 1, *Hyde Park-gate South, S. W.*
1864	Badger, Rev. Geo. P. 21, *Leamington-road-villas, Westbourne-park, W.*
1873	Bagge, Sir William, Bt., M.P. *Stradsett-hall, Market Downham, Norfolk.*
1863	Bagot, Christopher N., Esq. *Oriental Club, W.*
1862	Bagot, Capt. L. H. *Care of C. S. Bagot, Esq.*, 40, *Chancery-lane, W.C.*
1859	Bailey, L. C., Esq., Staff Commander, R.N. *Topographical Department, New-street, Spring-gardens, S. W.*
1872	Baillie, Capt. Wm. Hunter. 43, *Norfolk-square, W.*
1857	90 Baillie, Lieut.-Col. John (Bengal Staff Corps.) 17, *Palace-gardens-terrace, Kensington, W.*
1874	Bainbridge, Jno. Hugh, Esq. 115, *Eaton-square, S. W.*
1857	Baines, Thomas, Esq. *Care of E. L. King, Esq.*, 35, *Austin-street, King's Lynn, Norfolk.*

Year of Election.		
1873		Baines, W. Mortimer, Esq. *Fishergate-house, near York.*
1861		*Baker, John, Esq.
1862		Baker, Captain Robert B. *Oriental Club, Hanover-square, W.*
1865		Baker, Sir Samuel White, Pasha, F.R.S. 19, *Seymour-street, Portman-square, W.*
1871		Baker, T. B., Esq., C.B. *Wickham-park-terrace, Lewisham.*
1873		Baker-Cresswell, Lieutenant G. George. *Cresswell, Morpeth.*
1861		Baldwin, William Charles, Esq. *Leyland-vicarage, Preston.*
1861	100	Balfour, David, Esq. *Balfour-castle, Kirkwall, N.B.*
1847		Balfour, Maj.-Gen. Sir George, K.C.B., R.A., M.P. 6, *Cleveland-gardens, Hyde-park, W.; and Oriental Club, Hanover-square, W.*
1870		Balfour, Captain George M., R.N. 3, *Surrey-villas, Upper Norwood.*
1853		Balfour, John, Esq. 13, *Queen's-gate-place, S.W.*
1860		Ball, John, Esq., F.R.S. 10, *Southwell-gardens, South Kensington.*
1872		Balls, W. H., Esq. 3, *The Terrace, Kennington-park, S.*
1852		Bancroft, Col. W. C., 16th Regt. *M'Gregor and Co., Charles-street, S.W.*
1873		Bandini, His Highness Prince Guistiniani. *Rome.*
1858		Bannerman, Sir Alexander, Bart. 46, *Grosvenor-place, S.W.*
1872		Barber, Wm. Cambridge, Esq. *Cleeve-house, Lancaster-road, Notting-hill, W.*
1869	110	Barchard, Francis, Esq. *Horsted-place, Uckfield.*
1874		Barclay, Charles George, Esq. 30, *Phillimore-gardens, Kensington, W.*
1873		Barclay, Hugh G., Esq. *Monkhams, Woodford, Essex.*
1870		Barclay, Wm. L., Esq., B.A. *Leyton, Essex.*
1863		Barford, A. H., Esq., M.A. 1, *Cornwall-terrace, Regent's-park, N.W.*
1870		Baring, Capt. Evelyn, R.A. 11, *Berkeley-square, W.*
1835		*Baring, John, Esq. *Oakwood, Chichester.*
1844		*Baring, Thomas, Esq., M.P., F.R.S. 41, *Upper Grosvenor-street, W.*
1870		Barkly, Sir Henry, K.C.B., Governor of the Cape.
1862		Barlee, Frederick Palgrave, Esq. *Perth, Western Australia. Care of G. Laurence, Esq.*, 12, *Marlboro'-road, Lee, S.E.*
1868	120	Barlow, Frederick Thomas Pratt, Esq. 26, *Rutland-gate, S.W.*
1871		Barnes, Robert, Esq., M.D. 31, *Grosvenor-street, W.*
1872		Barnett, Edwd. Wm., Esq. 25, *Lancaster-gate, W.*
1864		Barnett, H. C., Esq., J.P. *York, West Australia.*
1867		*Barns, John W., Esq. *Bhawulpore, Punjaub, India; care of Messrs. Grindlay.*
1870		Barr, Edward G., Esq. 76, *Holland-park, W.; and* 36, *Mark-lane, E.C.*
1873		Barrett, Benjamin, Esq. *Licensed Victuallers' School, Kennington-lane, S.W.*
1859		Barrington, George, Viscount, M.P. 20, *Cavendish-square, W.*
1867		Barrington Ward, Mark J., Esq., B.A., F.L.S. (Her Majesty's Inspector of Schools). *Oakendale, Kenwood, Sheffield; and United University Club, S.W.*
1833		Barrow, John, Esq., F.R.S., F.S.A. 17, *Hanover-terrace, Regent's-park, N.W.*
1863	130	Barry, Alfred, Esq. *Shortlands, Bromley.*
1857		Bartholomew, John, Esq. 17, *Brown-square, Edinburgh.*
1862		Barton, Alfred, Esq., M.D. *Oriental Club, W.*

Year of Election.		
1837		*Bateman, James, Esq., F.R.S., F.L.S. 9, *Hyde-park-gate South, W.*
1859		Bateman, John F., Esq., C.E., F.R.S. 16, *Great George-street, Westminster, S.W.*
1873		Bates, General Henry, C.B. 2, *Sussex-place, Hyde-park, W.*
1866		Bates, Henry Walter, Esq., F.Z.S., F.L.S. 1, *Savile-row, W.*
1866		Bateson, George, Esq. *Heslington-hall, York.*
1873		Batten, Henry Howard, Esq. 21, *St. George's-square, S.W.; and Junior Carlton Club, Pall-mall, S.W.*
1866		Batten, John H., Esq. 2, *Manston-terrace, Heavitree, Exeter.*
1872	140	Battiscombe, Major Wm. Benj. 39, *Porchester-square, W.*
1858		Baxendale, Joseph H., Esq. *Worplesdon, Guildford.*
1867		Baxter, Richard, Esq., Barrister-at-Law. 19, *Leinster-gardens, Bayswater, W.*
1863		Bayley, H., Esq. *Blackheath-park, Kent.*
1873		*Baylis, Capt. E. W. D. 28, *John-street, Bedford-row, W.C.*
1862		Bayly, Lieut.-Col. John, R.E. *Ordnance Survey Office;* 131, *St. George's-road, Pimlico, S.W.*
1862		Baynes, Lieut.-Col. R. Stuart. *Army and Navy Club, S.W.; and* 38, *Jermyn-street, S.W.*
1872		*Baynes, A. Henry, Esq. 19, *Castle-street, Holborn, E.C.*
1872		*Baynes, Wm. Wilberforce, Esq., D.L. *Campbelton House, Croydon.*
1868		Baynton, Captain Edward. *Trafalgar-lodge, Shirley, Southampton.*
1874	150	Beach, W. J., Esq. 25, *Down-street, Piccadilly, W.*
1871		Beadon, Sir Cecil, K.C.S.I. *Cheltenham; and* 15, *Elvaston-place, South Kensington, W.*
1872		Beaton, Capt. John. 13, *Palace-gardens-terrace, W.*
1854		*Beaufort, William Morris, Esq., Bengal Civil Service. *Athenæum Club, S.W.*
1856		Beaumont, John Aug., Esq. 81, *Lancaster-gate, W.; and Wimbledon-park-house, Wimbledon, S.W.*
1870		*Beaumont, Somerset, Esq. 23, *Park-street, Park-lane, W.*
1851		*Beaumont, Wentworth B., Esq., M.P. 144, *Piccadilly, W.; and Bretton-park, Wakefield.*
1872		Beavan, Lieut. Reginald. *Messrs. Grindlay and Co.,* 55, *Parliament-street, S.W.*
1867		*Beazeley, Michael, Esq., M.I.C.E. *Vernon-house, Willesden-lane, Kilburn, N.W.*
1871		Beazley, Captain Geo. G., 83rd Regiment. *Army and Navy Club, S.W.*
1865	160	Bebb, Horatio, Esq. 13, *Gloucester-place, W.; and Leamington.*
1838		*Beckford, Francis Love, Esq. *Orford-house, Ham-common, Surrey.*
1870		*Bective, Thomas, Earl of. 35, *Dover-street, W.; and Underley-hall, Kirkby Lonsdale, Westmoreland.*
1859		Bedford, Rear-Admiral G. Augustus. *South-view, Widmore-road, Bromley, Kent.*
1872		Bedwell, F. Le Breton, Esq. *Razelle, Wallington, Surrey.*
1870		*Beer, Julius, Esq. 23, *Park-crescent, Portland-place, W.*
1868		Bedingfeld, Felix, Esq., C.M.G. 36, *Green-street, Park-lane; and Reform Club, S.W.*
1861		*Begbie, James, Esq. 2, *East India Avenue, Leadenhall-street, E.C.*

Year of Election.		
1860		Begbie, Thomas Stirling, Esq. 4, *Mansion-house-place, E.C.*
1846		*Beke, Charles Tilstone, Esq., PH. DR., F.S.A., &c. *London Institution, Finsbury-circus, E.C.*
1853	170	Belcher, Rev. Brymer. *St. Gabriel's, Pimlico, S.W.*
1830		*Belcher, Admiral Sir Edward, K.C.B., F.R.A.S. 13, *Dorset-street, Montagu-square, S.W.*
1858		Beldam, Edw., Esq. *Royston, Herts.*
1858		*Bell, C. Davidson, Esq., Surveyor-General, Cape of Good Hope. *Cape Town. Care of the S. A. Pub. Library, Cape Town. Per Messrs. H. S. King and Co.*
1874		Bell, H. Douglas, Esq. 64, *Oakley-square, S.W.*
1868		Bell, Wm. A., Esq., B.A., M.D. 18, *Hertford-street, Mayfair, W.*
1871		Bell, Major, W. M. *Belgrave-mansions, S.W.*
1874		Bell, William Moore, Esq. *Wigton, Cumberland.*
1864		Bellamy, Edward, Esq.
1872		Bellville, Alfred, Esq. 20, *Penn-road-villas, Holloway, N.*
1863	180	Belmore, The Earl of. *Governor of New South Wales.*
1873		Benjamin, Horace B., Esq. 22, *Glasshouse-street, Regent-street, S.W.*
1870		Benjamin, Joseph, Esq. 22, *Glasshouse-street, Regent-street, W.*
1830		*Bennett, John Joseph, Esq., F.R.S. *Sandrock, Maresfield, Sussex.*
1857		Bennett, J. Risdon, Esq., M.D. 15, *Finsbury-square, E.C.*
1872		Bennie, A., Esq. 7, *Broad Sanctuary, Westminster, S.W.; and Oriental Club, W.*
1856		*Benson, Robert, Esq. 16, *Craven-hill-gardens, Bayswater, W.*
1856		*Benson, William, Esq., Barrister-at-Law. 16, *Craven-hill-gardens, Bayswater, W.*
1830		Bentham, George, Esq., Pres. L.S., F.R.S. 25, *Wilton-place, S.W.*
1868		Bentley, George, Esq. *Upton-park, Slough.*
1870	190	*Benyon, Wm. H., Esq. *Stainley-hall, Ripon, Yorkshire.*
1859		Berens, H. Hulse, Esq. *Sidcross, Foot's Cray, Kent.*
1865		Bernard, P. N., Esq. 16, *Leadenhall-street, E.C.*
1856		Berry, Josiah, Esq. 16, *Regent-square, W.C.*
1872		Berthon, Peter Hy., Esq. 20, *Margaret-street, Cavendish-square, W.*
1871		Best, Commr. Jno. Chas. 91, *Westbourne-terrace, Hyde-park, W.*
1863		Best, William, Esq. *Kelstone, Millbrook, S. Hants.*
1867		Best, William John, Esq. *Franklin-street, Belfast.*
1867		Bethune, Alexander M., Esq. *Otterburn, Hamlet-road, Upper Norwood; and* 122, *Leadenhall-street, E.C.*
1842		*Bethune, Admiral C. R. Drinkwater, C.B. 4, *Cromwell-rd., South Kensington, W.*
1836	200	Betts, John, Esq. 115, *Strand, W.C.*
1866		Bevan, William, Esq. 12, *Bolton-gardens, South Kensington, W.*
1873		*Bibby, Edward, Esq. *Care of John Bibby, Esq., Hart-hill, Liverpool.*
1862		Bicker-Caarten, Peter, Esq. 30, *Northumberland-place, Bayswater, W.*
1871		Bickersteth, Ven.-Archd., D.D. *The Prebendal, Aylesbury, Buckinghamshire.*
1868		*Bickmore, A. S., Esq., M.A. 252, *Pearl-street, New York.*
1866		Bicknell, Algernon S., Esq. 37, *Onslow-square, S.W.*
1860		Bidder, G. Parker, Esq., C.E. 24, *Gt. George-st., S.W.; and Mitcham, Surrey, S*

Year of Election.		
1871		Biddulph, Geo. Tournay, Esq. 43, *Charing-cross, S.W.*
1869		Bidie, Geo., Esq., M.D., &c. Madras Establishment, Madras. *Care of Messrs. H. S. King and Co.*
1865	210	Bidwell, Charles Toll, Esq. *H.M. Consul, Balearic Islands. Care of H. J. Bidwell, Esq., Audit Office, Somerset House, W.C.*
1859		Bigge, Frederick W., Esq. *Knole, Frant, Sussex.*
1868		Biggs, C. H. Walker, Esq. 2, *Alexandra-terrace, Reading.*
1850		Bigsby, John J., Esq., M.D., F.R.S. 89, *Gloucester-place, Portman-square, W.*
1871		Birch, Hon. J. F. Woodford, Colonial Secretary, Singapore.
1860		Birch, H. W., Esq. 46, *Welbeck-street, Cavendish-square, W.*
1858		Birch, John William, Esq. 9b, *New Broad-street, E.C.; and* 27, *Cavendish-square, W.*
1862		*Birchill, Captain B. H. H. *Junior Carlton Club, S.W.*
1872		*Bird, Richard, Esq. *Wynyan-house, Fulham, S.W.*
1867		*Bischoffsheim, Henri Louis, Esq. 75, *South Audley-street, W.*
1858	220	Bishop, George, Esq., F.R.A.S. *Union Club, S.W.; and The Meadows, Twickenham, S.W.*
1861		Bishop, James, Esq. 11, *Portland-place, W.*
1870		Bishop, Wm. Henry, Esq. 8, *Prince of Wales-terrace, Kensington-palace, W.*
1867		Bisson, Capt. Frederick S. de Carteret, R.I.M. 70, *Berners-street, W.*
1870		Black, Andrew H., Esq. 23, *Royal-crescent, Glasgow.*
1860		*Black, Francis, Esq. 6, *North-bridge, Edinburgh.*
1867		Black, Thomas, Esq., Superintendent P. and O. Steam Navigation Company's Dockyard. *Oriental-place, Southampton.*
1869		Blacker, Louis, Esq. *Flowermead, Wimbledon-park, S.W.*
1870		Blackie, Thos. M., Esq., F.S.A. *Chipping-hill School, Witham, Essex.*
1849		Blackie, W. Graham, Esq., PH. DR. 36, *Frederick-street, Glasgow.*
1871	230	Blackmore, W., Esq. *Founder's-court, Lothbury, E.C.*
1862		*Blackstone, Frederick Elliot, Esq., B.C.L. *British Museum, W.C.*
1873		Blagden, Robert, Esq. *Junior Carlton Club, Pall-mall, S.W.*
1869		Blaine, Henry, Esq. 2, *Cleveland-road, Castle-hill, Ealing, W.*
1874		Blair, Captain H. F., R.E. 16, *Clarendon-terrace, Hyde-park, W.*
1868		Blair, William Edward, Esq. *Windham Club, S.W.*
1865		Blake, Brig.-Gen. H. W.
1857		*Blake, Wollaston, Esq., F.R.S. 8, *Devonshire-place, W.*
1872		Blakemore, Ramsey, Esq. *Wimbledon, S.W.*
1861		*Blakeney, William, Esq., R.N. *Hydrographic-office, S.W.*
1868	240	Blakiston, Matthew, Esq. 18, *Wilton-crescent, S.W.*
1857		Blakiston, Captain Thomas, R.A. 18, *Wilton-crescent, S.W.*
1868		Blanc, Henry, Esq., M.D., &c. *Care of Messrs. H. S. King and Co.*, 45, *Pall-mall, S.W.*
1873		*Blanford, W. T., Esq., F.G.S. 12, *Keppel-street, Russell-square, W.C.*
1857		Blanshard, Richard, Esq. *Fairfield, Lymington, Hants.*
1854		Blencowe, W. Robert, Esq. *The Hook, Lewes.*

Year of Election.		
1839		*Blewitt, Octavian, Esq. 4, *Adelphi-terrace, Strand, W.C.*
1864		Blore, Edward, Esq., D.C.L., F.R.S., F.S.A., &c. 4, *Manchester-square, W.*
1866		Blow, William Wootton, Esq. *Care of Robert Evans, Esq., Belvedere-park, North Kent.*
1861		Bloxsome, Oswald, jun., Esq. *Berrington-hall, Leominster.*
1868	250	Blumberg, George F., Esq. *Mansfield-house, Clifton-gardens, Maida-vale, W.*
1872		*Blundell, Charles Weld, Esq. *Ince, Blundell-hall, Great Crosby; and Brooks' Club.*
1837		*Blunt, Jos., Esq.
1863		*Blunt, Wilfred S., Esq. *Worth, Crawley, Sussex.*
1871		Blyth, Henry, Esq. 53, *Wimpole-street, S.W.*
1868		Blyth, Philip P., Esq. (J.P. for Middlesex). 53, *Wimpole-street, W.*
1858		Bohn, Henry G., Esq. 18, *Henrietta-street, Covent-garden, W.C.; and North-end-house, Twickenham, S.W.*
1850		Bollaert, William, Esq. 36, *Weymouth-street, Portland-place, W.*
1862		Bolton, Major Francis John, 12th Regiment. 2, *Westminster-chambers, S.W.*
1861		Bompas, George Cox, Esq. 15, *Stanley-gardens, Kensington-park, W.*
1861	260	Bonney, Charles, Esq. *Adelaide, Australia.*
1858		Bonnor, George, Esq. 49, *Pall-mall, S.W.; and 2, Bayswater-terr., Kensington-square, W.*
1865		Bonwick, James, Esq. *St. Kilda, Melbourne. Care of W. Beddow, Esq., 22, South Audley-street, W.*
1872		Booker, Samuel, Esq. 47, *Albany, Old Hall-street, Liverpool; and Demerara.*
1866		Booker, Wm. Lane, Esq. *Care of Messrs. F. O'Brien and Co., 43, Parliament-street, S.W.*
1845		*Borrer, Dawson, Esq. *Altmont Ballon, Co. Carlow, Ireland.*
1856		*Botcherby, Blackett, Esq., M.A. 174, *Brompton-road, S.W.*
1858		*Botterill, John, Esq. *Flower-bank, Burley-road, Leeds.*
1871		Bourne, John, Esq., C.E. 21, *Richmond-road, Bayswater, W.*
1872		Bousfield, William, Esq., B.A. 31, *Stanhope-gardens, Queen's-gate, W.*
1860	270	Boustead, John, Esq. 34, *Craven-street, Strand, W.C.*
1866		*Boutcher, Emanuel, Esq. 12, *Oxford-square, Hyde-park, W.*
1865		Bouverie, P. P., Esq. 32, *Hill-street, Berkeley-square, W.*
1867		Bowell, Wm., Esq., F.E.I.S. *Chandos-house, Hereford; and Gate-house Grammar-school, Hereford.*
1861		*Bowen, Charles Christopher, Esq. *Christchurch, Canterbury, New Zealand. Care of A. O. Ottywell, Esq., 7, Westminster-chambers, S.W.*
1854		*Bowen, Sir George Ferguson, K.C.M.G., M.A., *Governor of New Zealand.*
1871		*Bowers, Captain Alexander. *Care of Messrs. Fraser and Co., Penang.*
1871		Bowes, John, Esq. *Warrington, Lancashire.*
1862		Bowie, John, Esq. *Conservative Club, S.W.*

Year of Election.		
1869		Bowker, James Henry, Esq. *Basutoland, South Africa. Care of Messrs. King and Co., Cornhill, E.C.*
1868	280	Bowly, William, Esq. *Cirencester.*
1856		Bowman, John, Esq. 9, *King William-street, E.C.*
1869		Bowra, E. C., Esq., Commissioner of Maritime Customs. *Ningpo, China; and Newlands, East Grinstead, Sussex.*
1865		Bowring, John Charles, Esq. *Larkbeore, Exeter.*
1866		Bowring, Samuel, Esq. 1, *Westbourne-park, W.*
1868		Bowser, Alfred T., Esq. *Cromwell-house, Hackney, E.*
1862		Boyce, Rev. W. B., Secretary to Wesleyan Missionary Society. *Wesleyan Mission-house, Bishopsgate-street, E.C.*
1845		*Boyd, Edward Lennox, Esq., F.S.A. 35, *Cleveland-square, Hyde-park, W.*
1874		Boyd, William, Esq. *Peterhead, Aberdeenshire.*
1869		Boyle, Richard Vicars, Esq., C.S.I., Engineer in Chief to the Government Railways and Telegraph. *Japan. Care of Messrs. Grindlay and Co., 55, Parliament-street, S.W.*
1870	290	*Bragge, William, Esq., C.E. *Shirle's-hill, Sheffield.*
1862		Braithwaite, Isaac, Esq. 27, *Austin-friars, E.C.*
1863		*Bramley-Moore, John, Esq. *Langley-lodge, Gerrard's-cross, Bucks.*
1859		*Brand, James, Esq. 109, *Fenchurch-street, E.C.*
1868		Brand, James Ainsworth, Esq. 50, *Old Broad-street, E.C.*
1872		Brander, Captain William M., 24th Foot. *Chatham.*
1867		Brandis, Dr. D., F.L.S. *Director of Forests, Calcutta. Care of W. H. Allen, Esq., 13, Waterloo-place, S.W.*
1871		*Brassey, Thomas, Esq., M.P. 24, *Park Lane W.; and Normanhurst Court, Battle.*
1859		Braybrooke, Philip Watson. *Assistant Colonial Secretary, Ceylon. Messrs. Price and Co., Craven-street, W.C.*
1833		*Brereton, Rev. John, LL.D., F.S.A. *Bedford.*
1834	300	*Breton, Commr. Wm. Henry, R.N., M.R.I. 15, *Camden-crescent, Bath; and The Rectory, Charmouth, Dorset.*
1862		Brett, Charles, Esq.
1867		Bridge, John, Esq. *Heatley-house, near Lymm, Cheshire.*
1874		Bridgeman, Granville, Esq. 29, *Thistle-grove, S.W.; and Junior Conservative Club, King-street, St. James's.*
1873		Bridger, Captain W. Milton, R.N. *Army and Navy Club, S.W.*
1858		Bridges, Nathaniel, Esq.
1852		*Brierly, Oswald W., Esq. 8, *Lillington-place, Harrington-square, Hampstead-road, N.W.*
1865		Briggs, Colonel J. P. *Lantern Tower, Jedburgh.*
1861		*Bright, Sir Charles T., F.R.A.S. 26, *Duke-street, Westminster, S.W.*
1868		Bright, Henry Arthur, Esq. *Ashfield, Knotty Ash, Liverpool.*
1860	310	Bright, James, Esq., M.D. 12, *Wellington-square, Cheltenham.*
1854		Brine, Colonel Frederic, R.E. K.T.S. A.I.C.E., Executive Engineer, Punjaub. *Athenæum Club, S.W.; Army and Navy Club, S.W.; Garrick Club, W.C.; and 3, Leigham-terrace, Plymouth.*

Year of Election.	
1856	Brine, Captain Lindesay, R.N., *Boldre-house, Lymington, Hants; United Service Club, S. W.; and H.M.S. 'Briton,' East Indies.*
1861	Bristowe, Henry Fox, Esq. 6, *Chesham-place, S. W., and* 22, *Old-square, Lincoln's-inn, W.C.*
1861	Broadwater, Robert, Esq. 3, *Billiter-square, Fenchurch-street, E.C.*
1861	Brodie, Walter, Esq. *Orsett-house, Orsett-terrace, Hyde-park, W.*
1861	Brodie, William, Esq. *Eastbourne, Sussex.*
1863	*Brodrick, The Hon. George C. 32A, *Mount-street, W.*
1864	*Brooke, Sir Victor A., Bart. *Colebrooke-park, Co. Fermanagh, Ireland.*
1872	Brookes, Clifford J., Esq. *Calcutta. Care of W. G. Thorpe, Esq.,* 1, *Riches-court, Lime-street, E.C.*
1862	320 Brookes, Thomas, Esq. *Mattock-lane, Ealing, W.*
1856	*Brooking, George Thomas, Esq. 33, *Sussex-gardens, Hyde-park, W.*
1856	*Brooking, Marmaduke Hart, Esq. 11, *Montagu-place, Bryanston-square, W.*
1870	*Brooks, Wm. Cunliffe, Esq., M.P., M.A., F.S.A., &c. 5, *Grosvenor-square, S.W.; Barlow-hall, near Manchester; and Forest of Glen-Tanar, Aboyne, Aberdeenshire.*
1863	*Broughall, William, Esq. *Broadwater, Down, Tunbridge-wells.*
1868	*Brown, Colonel David (Madras Staff Corps). *India.*
1856	*Brown, Daniel, Esq. *The Elms, Larkhall-rise, Clapham, S.*
1864	Brown, Edwin, Esq., F.G.S. *Burton-on-Trent.*
1860	Brown, James, Esq. *Rossington, Yorkshire.*
1874	Brown, J. B. Esq. 90, *Cannon-street, E.C.; and Bromley, Kent.*
1865	330*Brown, James R., Esq., F.R.S.N.A. Copenhagen. 84, *Caversham-road, N.W.*
1861	*Brown, John Allen, Esq. *Surrey-lodge, Somerset-road, Ealing, W.*
1867	Brown, Richard, Esq., C.E. 115, *Lansdowne-road, Notting-hill, W.*
1867	Brown, Robert, Esq. 4, *Gladstone-terrace, Hope-park, Edinburgh.*
1856	*Brown, Samuel, Esq. 11, *Lombard-st., E.C.; and The Elms, Larkhall-rise, Clapham, S.*
1858	*Brown, Thomas, Esq. 8, *Hyde-park-terrace, Hyde-park, W.*
1859	Brown, William, Esq. *Loat's-road, Clapham-park, S.*
1863	Browne, H. H., Esq. *Moor-close, Binfield, Bracknell.*
1862	Browne, John Comber, Esq., Superintendent and Inspector of Government Schools. *Port Louis, Mauritius.*
1858	*Browne, John H., Esq. *Montpellier-lawn, Cheltenham.*
1869	340 Browne, Samuel Woolcott, Esq. 58, *Porchester-terrace, Hyde-park, W.*
1864	*Browne, Captain Wade. 35, *Charles-street, Berkeley-square, W.*
1858	Browne, William J., Esq. *Merly-house, Wimborne, Dorsetshire.*
1870	Browne, Wm. A. Morgan, Esq. *Grove-house, The Glebe, Champion-hill, S.E.*
1852	Browning, H., Esq. 73, *Grosvenor-street, Grosvenor-square, W.; and Old Warden-park, Biggleswade.*
1856	*Browning, Thomas, Esq. 6, *Whitehall, S.W.*
1863	Brunton, John, Esq., M.I.C.E., F.G.S. 13A, *Great George-street, S.W.*
1873	Brunton, R. H., Esq., F.G.S., &c. 1, *Oxford-villas, Balham, S.W.*

Year of Election.		
1856		Bryant, Walter, Esq., M.D., F.R.C.S. 23A, *Sussex-square, Hyde-park-gardens, W.*
1867		*Buccleuch, His Grace the Duke of, K.G., F.R.S. *Dalkeith Palace, near Edinburgh; and Montagu-house, Whitehall, S.W.*
1874	350	*Buchanan, Thos. Ryburn, Esq. *All Souls' College, Oxford.*
1869		Buckley, John, Esq. *Care of Messrs. Dalgety, Du Croz, and Co., 52, Lombard-street, E.C.*
1863		Budd, J. Palmer, Esq. 30, *Cornwall-gardens, South Kensington, W.*
1867		*Bulger, Major George Ernest, F.L.S., &c. *Care of Mr. Booth, 307, Regent-st., W.*
1868		*Bull, William, Esq., F.L.S. *King's-road, Chelsea, S.W.*
1865		Buller, Sir Edward M., Bart., M.P. *Old Palace-yard, S.W.; and Dilhorn-hall, Cheadle, Staffordshire.*
1869		Buller, Walter L., Esq., F.L.S. *Wanganui, New Zealand. Care of Mr. J. Van Voorst, 1, Paternoster-row, E.C.*
1863		Bullock, Captain Charles J., R.N. *Hydrographic-office, S.W.*
1860		*Bunbury, Sir Charles James Fox, Bart., F.R.S. *Barton-hall, Bury St. Edmund's.*
1839		Bunbury, E. H., Esq., M.A. 35, *St. James's-street, S.W.*
1863	360	Bundock, F., Esq. *Windham Club, S.W.*
1874		Burch, Isaac Howe, Esq. *Burlington-chambers,* 180, *Piccadilly, W.*
1861		Burges, William, Esq. *Fethard, Co. Tipperary.*
1866		*Burgess, James, Esq., M.R.A.S., Archæological Reporter, &c., to Government. *Bombay.* 8, *Merchiston-terrace, Edinburgh. Care of Messrs. Trübner, Ludgate-hill, E.C.*
1871		*Burke, Samuel Constantine, Esq. 84, *Harbour-street, Kingston, Jamaica.*
1864		Burn, Robert, Esq. 5, *Clifton-place, Sussex-square, W.*
1872		Burne, Major O. F. *India-office, S.W.*
1871		Burney, Commr. Chas., R.N., *Superintendent Greenwich Hospital Schools, S.E.*
1863		*Burns, John, Esq. *Castle Wemyss, by Greenock, N.B.*
1861		*Burr, Higford, Esq. 23, *Eaton-place, S.W.: and Aldermaston-court, Berkshire.*
1872	370	Burrows, Sir J. Cordy. 62, *Old Steine, Brighton.*
1857		Burstal, Captain E., R.N. 9, *Park-villas, Lower Norwood, S.*
1872		Burt, Charles, Esq. *Friars'-Stile-lodge, Richmond-hill.*
1830		*Burton, Alfred, Esq. 64, *Marina, St. Leonard's.*
1833		*Burton, Decimus, Esq., F.R.S. 1, *Gloucester-houses, Gloucester-crescent, W.*
1859		*Burton, Capt. Richd. Fras., 18th Regt. Bombay N.I. *Athenæum Club;* 14, *Montagu-place, Montagu-square, W. Care of R. Arundell, Esq., Admiralty, Spring-gardens, S.W.*
1869		Burton, William Samuel, Esq. *South-villa, Regent's-park, N.W.*
1858		Bury, William Coutts, Viscount. 48, *Rutland-gate, S.W.*
1861		Bush, Rev. Robert Wheler, M.A. 29, *Milner-square, Islington, N.*
1874		Bushell, Dr. Nathaniel, *Berkley-street Academy, Liverpool.*
1874	380	Bushell, Dr. S. W., M.D. *Poulton, Wingham, Kent.*
1873		Busk, Capt. Hans, D.L., LL.D., F.R.S., Hon. D.C.L. Oxford. 21, *Ashley-place, S.W.; and United University Club.*
1868		Busk, William, Esq., M.C.P., &c. 28, *Bessborough-gardens, S.W.*

Year of Election.		
1861		Butler, Charles, Esq. 3, *Connaught-place, Hyde-park, W.*
1867		Butler, E. Dundas, Esq. *Geographical Department, British Museum, W.C.*
1860		*Butler, Rev. Thomas. *Rector of Langar, Nottinghamshire.*
1871		Butler, Capt. W. F., 69th Regiment.
1870		Butter, Donald, Esq., M.D., &c. *Hazelwood, Church-road, Upper Norwood, S.E.*
1870		Buxton, Francis W., Esq., B.A. 23, *Upper Brook-street, W.*
1869		Buxton, Henry Edmund, Esq., B.A. *Bank-house, Great Yarmouth, Norfolk.*
1873	390	*Buxton, John H., Esq. *Brewery, Spitalfields, E.C.*
1858		*Buxton, Sir Thomas Fowell, Bart. 14, *Grosvenor-crescent, W.; and Warlies, Waltham-abbey, Essex.*
1830		*Cabbell, B. B., Esq., M.A., F.R.S., F.S.A. 1, *Brick-court, Temple, E.C.*; 52, *Portland-place, W.; and Aldwick, Sussex.*
1866		Caldbeck, Captain J. B. (P. and O. Sup. at Aden). 122, *Leadenhall-street, E.C. Care of Mrs. Caldbeck, Sunnieside, 21, Highbury-hill, N.*
1861		Calthorpe, The Hon. Augustus Gough. 33, *Grosvenor-square, W.*
1855		*Calthorpe, F. H. Gough, Lord. 33, *Grosvenor-square, W.*
1854		Calvert, Frederic, Esq., Q.C. 38, *Upper Grosvenor-street, W.*
1871		*Cama, Dorabjee Pestionjee, Esq. 3 *and* 4, *Winchester-street-buildings, E.C.*
1861		Cameron, Donald, Esq., M.P. *Auchnacarry, Inverness-shire.*
1872		Cameron, Capt. Donald R., R.A. 4, *Campden-grove, Kensington, W.*
1858	400	Cameron, Major-General Sir Duncan Alexander, R.E., C.B. *New Zealand.*
1873		Cameron, Henry Lovett, Esq. 25, *Granville-place, Portman-square, W.*
1864		Cameron, J., Esq. 32, *Great St. Helen's, E.C.*
1866		Cameron, R. W., Esq. 2?, *South William-street, New York. Care of Messrs. Brooks and Co., St. Peter's-chambers, Cornhill, E.C.*
1871		Campbell, Allan, Esq.
1873		Campbell, C. H., Esq. 10 *Eaton-place, S.W.*
1861		Campbell, Rear-Admiral Frederick, R.N.
1866		Campbell, Sir George, K.C.S.I., D.C.L., Lieut.-Governor of Bengal; *and Athenæum Club, S.W.*
1844		*Campbell, James, Esq. *Grove-house, Hendon, Middlesex; and* 37, *Seymour-street, W.*
1857		Campbell, James, Esq., Surgeon R.N. *The Grange, Chiswell-row, N.E.*
1834	410	*Campbell, James, Esq., jun. *Hampton-court-green, S.W.*
1863		*Campbell, James Duncan, Esq. *Peking. Care of H. C. Batchelor, Esq.*, 155, *Cannon-street, E.C.*
1869		Campbell, Robert, Esq., J.P. 31, *Lowndes-square, S.W.; and Buscot-park, Lechlade, Gloucestershire.*
1872		Campbell, Robert, Esq. *Lednock-bank, Comrie, Perthshire.*
1872		Campbell, William, Esq. *New Club, Glasgow.*
1856		Campbell-Johnston, A. R., Esq., F.R.S. *Heatherley, Sandhurst, near Wokingham, Berks.*

Year of Election.	
1871	Campos, Dr. J. B. Gonsalvez. *Maranham, Brazil.*
1866	Canning, Sir Samuel, C.E. *The Manor-house, Abbots Langley, near Watford, Herts.*
1864	Cannon, John Wm., Esq. *Castle-grove, Tuam.*
1857	Cannon, Lieut.-General R. 5, *Park-villas, Folkestone.*
1873	420*Cardwell, Edward H., Esq. 11, *Cromwell-place, S. Kensington, W.; Oxford and Cambridge and Garrick Clubs.*
1853	*Cardwell, Viscount. 74, *Eaton-square, S.W.*
1863	*Carew, R. Russell, Esq., J.P. *Carpenders-park, Watford, Herts; and Oriental Club, W.*
1873	Carey, Lieutenant H. C. (late I.N.) *Alma-road, Southport.*
1869	Carey, Rev. Tupper. *Fifield, Bavant, Salisbury; and 15, Hyde-park-gardens, W.*
1872	Carfrae, John, Esq. 31, *St. Swithin's-lane, E.C.; and Junior Conservative Club, King-street, St. James's.*
1862	Cargill, John, Esq., Member of the Legislative Assembly of New Zealand and Legislative Council of Otago. *Dunedin, Otago, New Zealand.*
1863	*Cargill, Wm. W., Esq. 4, *Connaught-place, Hyde-park, W.*
1873	Carillon, John Wilson, Esq., F.S.S., &c. *Wormhill, Buxton.*
1870	Carleton, Colonel Dudley. 42, *Berkeley-square, W.*
1858	430 Carlingford, Lord. 7, *Carlton-gardens, S.W.*
1864	*Carmichael, L. M., Esq., M.A., 5th Lancers. *Oxford and Cambridge Club, S.W.*
1865	*Carnegie, David, Esq. *Eastbury, by Watford, Herts.*
1863	Carnegie, Commander the Hon. J., R.N. 26, *Pall-mall, S.W.*
1869	Carr, William, Esq. *Dene-park, near Tunbridge.*
1861	Carter, Lieut.-Colonel Hugh Bonham, Coldstream Guards. *Guards' Club, S.W.: and 1, Carlisle-place, Victoria-street, S.W.*
1868	Carter, Captain Thomas Tupper, R.E. *Care of Messrs. H. S. King and Co., 45, Pall-mall.*
1873	Carter, Theodore, Esq. 10, *Hanover-street, Rye-lane, S.E.*
1857	Cartwright, Col. Henry, Grenadier Guards, M.P. *Lydon-hall, Bunbury.*
1874	Cartwright, William, Esq. *Care of H. C. Batchelor, Esq., 2, King William-street, E.C.*
1860	440*Carver, Rev. Alfred J., D.D., Master of Dulwich College. *Dulwich, S.E.*
1869	Casberd-Boteler, Commr. W. J., R.N. *The Elms, Teplow; and Naval and Military Club, Piccadilly, W.*
1858	Casella, Louis P., Esq. 147, *Holborn-bars, E.C.; and South-grove, Highgate, N.*
1873	Cathcart, Major Andrew. 16, *Grosvenor-street, S.W.*
1872	Caton, R. Redmond, Esq., F.S.A. *Union Club; and Binbrook-house, Market-manor, Lincolnshire.*
1872	Cattley, Edward, Esq. 34, *Woburn-square; and St. Petersburg.*
1860	Cave, Amos, Esq. 109, *New-road, Kennington-park, S.; and Rathbone-place, Oxford-street, W.*
1857	Cave, Captain Laurence Trent. 75, *Chester-square, W.*
1858	Cave, Right Hon. Stephen, M.P. 35, *Wilton-place, S.W.*
1869	Cayley, Dr. Henry.
1873	450 Chadwick, Jesse, Esq. 6 *Litchurch-terrace, Osmaston-road, Derby.*

Year of Election.		
1863		Challis, John Henry, Esq. *Reform Club, S.W.*
1871		*Chalmer, Lieut. Reginald, 60th Royal Rifles. *Peshawur, East Indies.*
1865		Chambers, Charles Harcourt, Esq., M.A. 2, *Chesham-place, S.W.*
1874		Champain, Major J. U. Bateman, R.E. *Chisholm-lodge, Queen's-road, Richmond.*
1858		Champion, John Francis, Esq. *High-street, Shrewsbury.*
1866		*Chandless, William, Esq. 5, *Portman-street, Oxford-street, W.*
1870		Chapman, Capt. E. F., R.A. *The Grove, Tunbridge.*
1863		*Chapman, Spencer, Esq. *Roehampton, S.W.*
1870		Charles, Rev. D., B.A. (Oxon), D.D. *University College, Aberystwith, South Wales.*
1861	460	Charnock, Richard Stephen, Esq., PH.DR., F.S.A. 8, *Gray's-inn-square, W.C.; and The Grove, Hammersmith.*
1872		Chatwood, Samuel, Esq. 5, *Wentworth-place, Bolton.*
1873		Chauntrell, Fred Dundas, Esq. 63, *Lincolns-inn-fields, W.C.*
1864		Cheadle, Walter, Esq., B.A., M.D. Camb. 2, *Hyde-park-place, Cumberland-gate, W.*
1873		Cheetham, Samuel, Esq. 11, *Rumford-place, Liverpool.*
1855		Cheshire, Edward, Esq. 3, *Vanbrugh-park, Blackheath, S.E.; and Conservative Club, S.W.*
1858		Chetwode, Augustus L., Esq. 7, *Suffolk-street, Pall-mall-east, S.W.; and Chilton-house, Thame, Oxfordshire.*
1870		Chichester, Sir Bruce, Bart. *Arlington-court, Barnstaple.*
1858		Childers, Right Hon. Hugh C. E., M.P. 17, *Prince's-gardens, W.; and Australia.*
1856		Childers, John Walbanke, Esq. *Cantley-hall, near Doncaster.*
1857	470	*Chimmo, Commr. William, R.N. *H.M.S. 'Nassau.' Care of the Hydrographic-office, S.W.*
1872		Chinery, D., Esq., Consul-General for Liberia. 30, *Gracechurch-street, E.C.*
1869		Chinnock, Frederick George, Esq. 86, *Cornwall-gardens, Queen's-gate, W.*
1874		*Cholmley, Harry Walter, Esq. *Howsham, near York.*
1872		Christie, James Alexander, Esq. *Flushing, Falmouth.*
1872		Christie, T. Beath, Esq., M.D. *Ealing.*
1871		Church, Colonel Geo. Earl. *Care of J. W. Barry, Esq.*, 19, *Great Winchester-street, E.C.*
1830		*Church, W. H., Esq.
1849		Churchill, Lord Alfred Spencer. 16, *Rutland-gate, S.W.*
1856		Churchill, Charles, Esq. *Weybridge-park, Surrey.*
1869	480	Churchill, Henry A., Esq., H.M. Consul, Zanzibar. *Care of Messrs. King and Co.*, 45, *Pall-mall, S.W.*
1870		Clapton, Edward, Esq., M.D., &c. *St. Thomas's-street, Southwark, S.E.*
1863		Clark, Lieut. Alex. J. 14, *St. James's-square, S.W.; and Lyeswell-house, Maindee, Newport, Monmouthshire.*
1870		Clark, Charles, Esq. 20, *Belmont-park, Lee, Kent, S.E.*
1872		Clark, George Thomas, Esq. *Dowlais-house, Dowlais, Glamorgan.*
1873		Clark, Sir John, Bart. 38, *Cornwall-gardens, W.; and Tilipronie, Aboyne, Aberdeenshire.*

Year of Election.		
1868		Clark, John Gilchrist, Esq. *Speddock, Dumfries, Dumfriesshire.*
1862		Clark, J. Latimer, Esq. 5, *Westminster-chambers, Victoria-street, S.W.; and Beechmont, Dulwich, S.E.*
1870		Clark, Robert, Esq. 46, *Chepstow-villas, Bayswater, W.*
1868		Clark, William, Esq. *The Cedars, South Norwood.*
1859	490	Clark, Rev. W. Geo., M.A. *Trinity College, Cambridge.*
1865		Clark, W. H., Esq. 6, *Leinster-terrace, Hyde-park, W.*
1874		*Clark-Kennedy, Alexander W. M., Esq., F.Z.S., (Coldstream Guards). *Guards' Club, Pall-mall, S.W.;* 14, *Prince's-gardens, S.W.; and Knockgray, County Kirkcudbright, N.B.*
1859		Clarke, Col. A., R.E. *Army and Navy Club, S.W.*
1874		Clarke, Captain F. C. H., R.A. *Adair-house, St. James's-square, S.W.*
1872		Clarke, Joseph, Esq. *North-hill-villa, Highgate, N.*
1855		*Clarke, Rev. W. B., M.A. *St. Leonard's, Sydney, New South Wales. Care of Messrs. Richardson, Cornhill.*
1868		Clarke, W., Esq. 44, *Ladbroke-grove, W.*
1862		Claude, Eugène, Esq. *Villa Helvetia, Carlton-road, Tufnell-park, N.*
1863		Clayton, Captain John W., late 15th Hussars. 14, *Portman-square, W.*
1866	500*	Cleghorn, Hugh, Esq., M.D. *Stravithy, St. Andrew's.*
1871		Cleghorn, John, Esq., M.S.S., M.S.A., &c. 3, *Spring-gardens, S.W.*
1863		Clements, Rev. H. G. *United University Club, S.W.*
1870		Clements, Robert George, Esq. 97, *Victoria-park-road, E.*
1860		Clerk, Captain Claude. *Military Prison, Aldershot, Hants.*
1858		Clermont, Thomas, Lord. *Ravensdale-park, Newry, Ireland.*
1845		*Cleveland, His Grace the Duke of. *Cleveland-house,* 17, *St. James's-square, S.W.*
1861		Clifford, Sir Charles. *Hatherton-hall, Cannock, Staffordshire.*
1858		Clifford, Charles Cavendish, Esq. *House of Lords, S.W.*
1871		Clifford, Henry, Esq., C.E. 1, *Lansdown-place, Blackheath, S.E.*
1866	510	Clinton, Lord Edward. *Army and Navy Club, S.W.*
1865		Clipperton, Robert Charles, Esq., H.B.M. Consul, Nantes.
1856		Clive, Rev. Archer. *Whitfield, Hereford.*
1863		Clowes, E., Esq. *Salisbury-square, Fleet-street, E.C.*
1854		Clowes, George, Esq. *Duke-street, Stamford-street, Blackfriars, S.E.; Charing-cross, S.W.; and Surbiton, Surrey.*
1854		Clowes, William, Esq. *Duke-street, Stamford-street, Blackfriars, S.E.; Charing-cross, S.W.; and* 51, *Gloucester-terrace, Hyde-park, W.*
1861		Clowes, William Charles Knight, Esq., M.A. *Duke-street, Stamford-street, Blackfriars, S.E.; and Surbiton, Surrey.*
1852		Cobbold, John Chevalier, Esq. *Athenæum Club, S.W.; and Ipswich, Suffolk.*
1859		Cochrane, Rear-Admiral the Hon. A., C.B. *Junior United Service Club, S.W.*
1873		*Cochrane, Kenneth, Esq., *Elmbank, Galashiels, N.B.*
1868	520	Cock, Edward, Esq. *Kingston-on-Thames.*
1869		*Cockburn, Captain James George. *6th Regiment, Belfast.*

Year of Election.		
1862		Cockerton, Richard, Esq. *Cornwall-gardens, South Kensington, W.*
1862		*Cockle, Captain George. 9, *Bolton-gardens, South Kensington, W.*
1859		Cocks, Colonel C. Lygon (Coldstream Guards). *Crediton, Devon.*
1865		Cocks, Major Octavius Yorke. 86, *Park-street, Grosvenor-square, W.*
1841		*Cocks, Reginald Thistlethwayte, Esq. 43, *Charing-cross, S.W.; and* 22, *Hertford-street, Mayfair, W.*
1871		*Cockshott, Arthur, Esq., M.A. *Eton College.*
1873		Codrington, General Sir William, G.C.B. 110, *Eaton-square, S.W.*
1872		*Coe, Rev. C. C. *Seymour-street, Leicester.*
1857	530	Coghlan, Edward, Esq. *Training-institution, Gray's-inn-road, W.C.*
1861		Coghlan, J., Esq., Engr.-in-Chief to the Government. *Buenos Ayres. Care of H. C. Forde, Esq.,* 6, *Duke-street, Adelphi, W.C.*
1862		Coghlan, Lieut.-Gen. Sir William M., K.C.B., R.A. *Ramsgate, Kent.*
1865		Colchester, Reginald Charles Edward, Lord. 1, *Wilton-street, S.W.*
1868		Cole, William H., Esq. 64, *Portland-place, W.*
1867		Colebrook, John, Esq. 15, *Hans-place, Chelsea, S.W.*
1841		*Colebrooke, Sir Thomas Edward, Bart., F.R.A.S. 37, *South-st., Park-lane, W.*
1854		Coleman, Everard Home, Esq., F.R.A.S. *Registry and Record Office, Adelaide-place, London-bridge, E.C.*
1848		Coles, Charles, jun., Esq. 86, *Great Tower-street, E.C.*
1873		Coles, Jno., Esq. *Mitcham, Surrey.*
1835	540	*Collett, William Rickford, Esq. *Carnarvon; and Carlton Club, S.W.*
1867		Collier, C. T., Esq., Barrister of the Middle Temple. *Oriental Club, W.*
1872		Collingwood, Lieut. W. *India-office, S.W.*
1858		Collinson, Henry, Esq. 7, *Devonshire-place, Portland-place, W.*
1866		Collinson, John, Esq., C.E. 37, *Porchester-terrace, Hyde-park, W.*
1855		Collinson, Vice-Admiral Richard, C.B. *Haven-lodge, Ealing, W.; and United Service Club, S.W.*
1871		*Collis, Capt. Gustavus W. Berry, 6th Royal Regiment. *Care of Mrs. Collis, Barton-terrace, Dawlish, Devon.*
1862		Colquhoun, Sir Patrick M. de, Q.C., LL.D. 2, *King's-bench-walk, Temple, E.C.*
1869		Colvill, William H., Esq., Surg. H.M. Ind. Army. *Lawn-bank, Hampstead; and Baghdad.*
1861		*Colville, Charles John, Lord. 42, *Eaton-place, S.W.*
1865	550	Colvin, Binny J., Esq. 71, *Old Broad-street, E.C.*
1868		Colvin, Captain W. B., Royal Fusiliers. *Care of Messrs. Cox and Co., Craig's-court, S.W.*
1868		Combe, Lieut. B. A.
1861		Combe, Thomas, Esq., M.A. *University Press, Oxford.*
1871		Comber, Colonel A. K. (Dep.-Commd. of Assam, Goalpara). *Care of Messrs. Woodhead.*
1864		Commerell, Commr. J. E., R.N., V.C.
1864		Conder, Rev. John. *Hallbrooke-house, New Wandsworth, S.W.*
1868		Coney, Rev. T., M.A.

Year of Election		
1861		Constable, Captain Chas. Golding, R.N. 6, *Harley-road, St. John's-wood, N.W.*
1872		*Cook, F. L., Esq. 3, *Cromwell-place, South Kensington.*
1868	560	Cook, H. Esq., M.D., &c. *Care of Messrs. Forbes and Co.*, 12, *Leadenhall-street, E.C.*
1871		Cook, Henry, Esq. *Grammar-school, Wantage, Berks.*
1859		Cooke, Lieut.-Col. A. C., R.E. *Bermuda.*
1863		*Cooke, E. W., Esq., A.R.A., F.R.S., F.L.S., F.Z.S., F.G.S., Accad. Bell. Art. Venet. et Holm. Socius. *Glen-Andred, Groombridge, Sussex; and Athenæum Club, S.W.*
1856		Cooke, John George, Esq. 25, *Austin-friars, Old Broad-street, E.C.*
1860		Cooke, Nathaniel, Esq. 5, *Ladbroke-terrace, Notting-hill, W.*
1852		Cooke, Robt. F., Esq. 50, *Albemarle-street, W.*
1860		Cooke, William Henry, Esq., Q.C. 4, *Elm-court, Temple, E.C.*
1872		*Cookson, F., Esq. *Teddington-hall, Teddington.*
1830		Cooley, William Desborough, Esq. 13, *College-place, Camden-town, N.W.*
1872	570	Cooper, Alfred, Esq. 9, *Henrietta-street, Cavendish-square, W.*
1872		Cooper, Commr. B. J. *Mouart, Torquay.*
1862		Cooper, Sir Daniel. 20, *Prince's-gardens, South Kensington, S.W.*
1856		Cooper, Lieut.-Col. Edward, Grenadier Guards. 5, *Bryanston-square, W.*
1860		Cooper, Lieut.-Col. Joshua H., 7th Fusiliers. *Dunboden, Mullingar.*
1874		Cooper W. W., Esq. 19, *Berkeley-square, W.*
1857		*Coote, Captain Robert, R.N. *Shales, Bittern, Southampton.*
1872		Cope, Charles Rogers, Esq. *Edgbaston, Warwick.*
1871		Cope, Henry, Esq. 35, *Princes-square, Bayswater, W.*
1874		Copland-Crawford, Lieut.-Gen. R. F., R.A. *Sudbury-lodge, Harrow, Middlesex.*
1853	580	Copley, Sir Joseph William, Bart. *Sprotborough, Doncaster.*
1864		Cork and Orrery, Earl of. 1, *Grafton-street, W.*
1868		Cork, Nathaniel, Esq. *Ivy-lodge*, 9, *Warwick-road, Upper Clapton, N.E.*
1868		Corner William Mead, Esq. *Esk-dale, Howard-road, Woodside, South Norwood; and* 105, *Leadenhall-street, E.C.*
1868		*Cornish-Brown, Charles, Esq. *Clifton-lodge, Farquhar-road, Norwood, S.E.*
1865		Cornthwaite, Rev. T., M.A. *Forest, Walthamstow.*
1860		Cornwell, James, Esq., PH.DR. *Purbrook, Crescent-wood-road, Sydenham-hill, S.E.*
1868		Cory, Frederic C., Esq., M.D. *Portland-villa, Buckhurst-hill, Essex; and Nassau-place, Commercial-road, E.*
1873		Cosson, Emilius Albert de, Esq. *Care of J. G. Walls, Esq., Chatte a-lodge, Kingston-on-Thames.*
1869		Coster, Guillaume F., Esq. 11, *Park-crescent, Regent's-park, N.W.*
1853	590	*Cosway, William Halliday, Esq. *Oxford and Cambridge Club, S.W.*
1856		Cottesloe, Lord. 20, *Eaton-place, S.W.*
1873		Cottrill, Robert Alfred, Esq. *Stanwell-house, Stanwell, near Staines.*
1873		Courtenay, J. Irving, Esq. 3 *Plowden-buildings, Temple, E.C.*
1863		Courtenay, L. W., Esq. *British Post-office, Constantinople. Care of R. Wood, Esq.*, 139, *Fleet-street.*

Year of Election.	
1862	Coward, William, Esq. *Rock-bank, Lordship-lane, Dulwich, S.E.*
1857	*Cowell, Lieut.-Col. Sir J. C., K.C.B., R.E. *Buckingham-palace, S.W.*
1854	Cowley, Norman, Esq. 4, *Montagu-place, Montagu-square, W.*
1871	Cowper, Sir Charles, K.C.M.G. 3, *Westminster-chambers, S.W.*
1871	Cowper, Henry Aug. (H.M. Com. Puerto Rico). *Care of Messrs. Woodhead,* 44, *Charing-cross, S.W.*
1862	600*Cowper, Sedgwick S., Esq. 3, *Upper Phillimore-place, West Kensington.*
1865	Coysh, John S., Esq. *Levant-house, St. Helen's-place, E.C.*
1870	*Cracroft, Bernard, Esq., M.A. Trin. Coll. Camb. *Oxford and Cambridge Club, S.W.; and* 8, *Savile-row, S.W.*
1867	Crane, Leonard, Esq., M.D. 7, *Albemarle-street, W.*
1848	Crawford, Robert Wigram, Esq. 71, *Old Broad-street, E.C.*
1873	Craufurd, George Ponsonby, Esq. *Buenos Ayres; and Travellers' Club, S.W.*
1857	Craufurd, Lieut.-General James Robertson, Grenadier Guards. *Travellers' Club, S.W.; and* 36, *Prince's-gardens, W.*
1866	Crawfurd, O. J., Esq. *Athenæum Club, S.W.*
1873	Creswell, Alf. Aug., Esq. 1, *Capel-court, E.C.; and Radford-vicarage, Notts.*
1861	Creswell, Rev. Samuel Francis, B.D., F.R.A.S. *Principal of the High School, Dublin.*
1859	610*Creyke, Captain Richard Boynton, R.N. *Gristhorpe-hall, Filey, Yorkshire.*
1856	Croker, T. F. Dillon, Esq. 19, *Pelham-place, Brompton, S.W.*
1864	Croll, A. A., Esq., C.E. *Southwood, Southwood-lane, Highgate.*
1868	Croll, Alex., Esq. *Mavis-bank, Grange-road, Upper Norwood.*
1860	*Croskey, J. Rodney, Esq. 43, *Portsdown-road, Maida-hill, W.; and* 30, *Parliament-street, W.*
1860	Crosse, Rev. Thomas, D.C.L., M.R.A.S. *Hastings.*
1862	Crossman, James Hiscutt, Esq. *Rolls-park, Chigwell, Essex.*
1863	*Crowder, Thos. Mosley, Esq., M.A. *Thornton-hall, Bedale, Yorkshire.*
1852	Crowdy, James, Esq. 17, *Serjeants'-inn, E.C.*
1874	Crowe, Francis, Esq., LL.D. 22, *Westbourne-park-road, W.*
1872	620 Cruikshank, Donald, Esq. *Junior Naval and Military Club,* 19, *Dover-street, W.*
1859	Cull, Richard, Esq., F.S.A. 13, *Tavistock-street, Bedford-square, W.C.*
1857	Cumming, William Fullarton, Esq., M.D. *Athenæum Club, S.W.; and Kinellan, Edinburgh.*
1860	Cunliffe, Roger, Esq. 24, *Lombard-street, E.C.; and* 10, *Queen's-gate, South Kensington, W.*
1853	Cunningham, John Wm., Esq., Sec. King's College. *Somerset-house, W.C.; and Harrow, N.W.*
1862	*Cunynghame, Lieut.-Gen. Sir A. T., K.C.B. *United Service Club, Pall-mall, S.W.*
1870	Cunynghame, Sir Edward A., Bart. *Army and Navy Club, S.W.*
1865	Cure, Capel, Esq. 51, *Grosvenor-street, W.*
1872	Curling, Lieut. J. Jas., R.E. 10, *Stanhope-gardens, South Kensington.*
1868	Currie, A. A. Hay, Esq., C.E. 18, *Acqua Sola, Genoa.*

Year of Election.	
1843	630*Cursetjee, Manockjee, Esq., F.R.S.N.A. *Villa-Byculla, Bombay.*
1839	*Curtis, Timothy, Esq.
1872	Cust, Robt. Needham, Esq. 64, *St. George's-square, S.W.*
1867	Cuttance, John Fras. J., Esq. *Cleveland-house, Greville-road, Kilburn, N.W.*
1872	Czarnikow, Cæsar, Esq. 29, *Mincing-lane, E.C.*
1874	Dadson, Arthur Jas., Esq. 11, *Mark-lane, E.C.*
1863	*Dalgety, Fred. G., Esq. 16, *Hyde-park-terrace, W.*
1864	Dallas, A. G., Esq. 3, *Ennismore-gardens, Prince's-gate, S.W.*
1870	Dallas, Geo. E., Esq. *Foreign-office, S.W.*
1865	D'Almeida, W. B., Esq. 19, *Green-park, Bath.*
1867	640 Dalrymple, Geo. Elphinstone, Esq. *Logie, Elphinstone, Aberdeenshire*
1868	Dalrymple, R. G. E., Esq.
1857	Dalton, D. Foster Grant, Esq. *Shanks-house, near Wincanton, Somerset.*
1859	Dalyell, Sir Robt. Alex. Osborn, Bart. *H.M.'s Consul at Rustchuk, Bulgaria.*
1868	Dalziel, William R., Esq. 5, *Gresham-park, Brixton, S.*
1866	Damer, Lieut.-Col. Lionel S. Dawson. 2, *Chapel-street, Grosvenor-square, W.*
1838	*Darwin, Charles, Esq., M.A., F.R.S. 6, *Queen Anne-street, Cavendish-square, W.*
1874	Davidson, Duncan, Esq. 4, *Lancaster-gate, S.W.*
1863	Davies, R. H., Esq., Chief Commissioner of Oudh, Lucknow. *Care of Messrs. Twining,* 215, *Strand, W.C.*
1873	Davies, Rev. R. V. Faithful. *Beachfield, Poulton-le-Fylde, Lancashire.*
1869	650*Davies, Robert E., Esq., J.P. *Crescent-villa, Kington, near Portsmouth.*
1873	Davies, W. Hy. Esq. 51, *Tregunter-road, South Kensington, W.*
1866	Davis, Edmund F., Esq. 6, *Cork-street, Bond-street, W.*
1866	Davis, Frederick E., Esq. 20, *Blandford-square, N.W.*
1874	Davis, Rev. James. 7, *Adam-street, Adelphi, W.C.*
1861	Davis, Captain John Edward, R.N. *Hydrographic-office, Admiralty, S.W.*
1846	Davis, Sir John Francis, Bart., K.C.B., F.R.S., F.R.S.N.A. *Athenæum Club, S.W.; and Hollywood, near Bristol.*
1868	Davis, Richard, Esq. 9, *St. Helen's-place, E.C.*
1840	*Dawnay, The Hon. Payan. *Beningborough-hall, Newton-upon-Ouse, Yorkshire.*
1870	Dawson, John Edward, Esq. *Oak-lodge, Watford, Herts.*
1865	660 Debary, Rev. Thomas, M.A. 35, *Mount-street, W.*
1866	Debenham, William, Esq. 16, *Gloucester-place, Portman-square, W.*
1856	De Crespigny, Lieutenant C., R.N. *Care of Messrs. King and Co.,* 65, *Cornhill, E.C.*
1865	De Łaski, A., Esq.
1869	De Leon, Dr. Hananel. 26, *Redcliffe-gardens, West Brompton, S.W.*
1868	Dell, William, Esq. *Messrs. Combe, Delafield, and Co., Long-acre.*
1862	Denham, Adm. Sir Henry Mangles, K.C.B., F.R.S. 21, *Carlton-road, Maida-vale, W.*
1860	Denison, Alfred, Esq. 6, *Albemarle-street, W.*
1870	Denniss, Colonel Shuckburgh. 30, *Duke-street, St. James's, S.W.*

Year of Election.	
1872	*Dent, Alfred, Esq. 12, *Hyde-park-gardens, W.*
1874	670 Dent, Clinton T. Esq. 16, *Lower Belgrave-street, S.W.*
1872	*Dent, Edward, Esq. 12, *Hyde-park-gardens, W.*
1870	Dentry, J., Esq. *Crescent School, Margate.*
1871	Dentry, James, Esq. *The College, Margate.*
1853	*Derby, Edward Henry, Earl of, P.C., LL.D., D.C.L. 23, *St. James's-square, S.W.; and Knowsley-park, Prescot, Lancashire.*
1867	De Salis, Major-Gen. Rodolph, C.B. 123, *Pall-mall, S.W.*
1872	Desmond, Rev. H. M. Egan. 27, *Colville-square, W.*
1874	Devas, Thomas, Esq. *Mount Ararat, Wimbledon.*
1854	*Devaux, Alexander, Esq. 2, *Avenue-road, Regent's-park, N.W.*
1874	Devereux, W. Cope, Esq., R.N. 106, *Brixton-road, S.E.*
1837	680*Devonshire, William Cavendish, Duke of, LL.D., D.C.L., M.A., F.R.S. *Devonshire-house, Piccadilly, W.; and Hardwicke-hall, Derbyshire.*
1853	De Wesselow, Lieut. Fras. G. Simpkinson.
1872	Dhuleep-Singh, His Highness the Maharaja. *Elveden-hall, near Thetford.*
1870	Dibdin, Charles, Esq. 62, *Torrington-square, W.C.*
1870	Dibdin, Robert W., Esq. 62, *Torrington-square, W.C.*
1862	Dick, Captain Charles Cramond. *Elmwood, Colyford, Axminster, Devon.*
1866	*Dick, Fitzwilliam, Esq., M.P. 20, *Curzon-street, Mayfair, W.*
1861	Dick, Robert Kerr, Esq., Bengal Civil Service. *Oriental Club, W.*
1866	Dick, William Graeme, Esq. 29, *Leinster-square, W.*
1830	*Dickinson, Francis Henry, Esq., F.S.A. 119, *St. George's-square, Pimlico, W.; and Kingweston-park, Somerset.*
1852	690 Dickinson, John, Esq., jun. *Athenæum Club, S.W.*
1854	*Dickinson, Sebastian Stewart, Esq., M.P., Barrister-at-Law. 12, *Suffolk-street, Pall-mall; and Brown's-hill, Stroud, Gloucestershire.*
1859	Dickson, A. Benson, Esq. 4, *New-square, Lincoln's-inn, W.C.*
1860	Dietz, Bernard, Esq., of Algoa Bay. 3, *Dorset-square, W.*
1859	Digby, G. Wingfield, Esq. *Sherborne-castle, Dorset.*
1860	Digby, Lieut.-Col. John Almerous. *Chalmington-house, Cattstock, Dorchester.*
1859	*Dilke, Sir Charles Wentworth, Bart., M.P. 76, *Sloane-street, S.W.*
1856	Dillon, The Hon. Arthur. 17, *Clarges-street, W.*
1864	Dimsdale, J. C., Esq. 50, *Cornhill, E.C.; and* 52, *Cleveland-square, S.W.*
1873	Dineen, Thomas, Esq. 51, *Havelock-terrace, Workington.*
1872	700 Divett, Edwd. Ross, Esq. *Reform Club, S.W.*
1867	Dix, Thomas, Esq. 10, *Amwell-street, W.C.*
1872	Dixon, Joseph, Esq. *Hillsbro'-hall, Sheffield.*
1861	Dixon, Lieut.-Colonel John. 18, *Seymour-street, Portman-square.*
1854	Dixon, W. Hepworth, Esq., F.S.A. 6, *St. James's-terrace, St. John's-wood, N.W.*
1873	Dodd, Jno., Esq. *Tamsui, Formosa. Care of Jno. Ewart, Esq., 7, Lancaster-street, Hyde-park, W.*
1854	Dodson, Right Hon. John George, M.P. 6, *Seamore-place, Mayfair, W.*

Year of Election.		
1867		Donald, James, Esq. 339, *High-street, Edinburgh.*
1858		Donne, John, Esq. *Instow, North Devon.*
1873		Doria, Marquis Giacomo. *Genoa. Care of Kirkland, Cope, and Co.*, 23, *Salisbury-street, Strand.*
1868	710	Douglas, James A., Esq. *The Grange, Coulsdon, near Caterham.*
1868		Douglas, John, Esq. *Angus-lodge, Portsea.*
1870		Douglas, John, Esq.
1868		Douglas, Captain N. D. C. F. *Guards' Club, S.W.*
1871		Douglas, Stewart, Esq. 5, *Chester-terrace, Eaton-square, S.W.*
1874		Dowling, Edward Samuel, Esq. 14, *Holland-villas-road, Kensington, W.*
1871		Down, J. H. Langdon, Esq., M.D. 39, *Welbeck-street, W.; and Normansfield, Hampton Wick.*
1853		Doyle, Sir Francis Hastings C., Bart. *Custom-house, E.C.*
1845		*Drach, Solomon Moses, Esq., F.R.A.S. 74, *Offord-road, Barnsbury, N.*
1872		*Drew, Frederick, Esq. *Claremont-road, Surbiton.*
1869	720	Drummond, Alfred Manners, Esq. *Charing-cross, S.W.*
1865		Drummond, E. A., Esq. 2, *Bryanston-square, W.*
1846		Drummond, Lieut.-General John. *The Boyce, Dymock, Gloucestershire.*
1846		Drury, Captain Byron, R.N. 4, *Cambridge-villas, Cheltenham.*
1851		*Du Cane, Major Francis, R.E. *Brentwood, Essex.*
1851		*Ducie, Henry John, Earl of, F.R.S. 16, *Portman-square, S.W.*
1859		Duckworth, Henry, Esq. *Holmfield-house, Aigburth, near Liverpool.*
1860		*Duff, Mountstuart Elphinstone Grant, Esq., M.P. 4, *Queen's-gate-gardens, South Kensington, W.*
1868		Duff, Wm. Pirie, Esq. *Calcutta. Care of Messrs. John Watson and Co.*, 34, *Fenchurch-street, E.C.*
1857		*Dufferin, Right Hon. Fredk. Temple Hamilton-Blackwood, Earl of, K.P., K.C.B., F.R.S. 8, *Grosvenor-square, and Dufferin-lodge, Fitzroy-park, Highgate, N.*
1866	730	*Dugdale, Captain Henry Charles G. *Merevale-hall, Atherstone, Warwick.*
1867		*Dugdale, John, Esq. 1, *Hyde-park-gardens; and Llwyn, Llanfyllin, Oswestry.*
1868		Dunbar, John Samuel A., Esq. 28, *Pembridge-crescent, Bayswater, W.; and* 4, *Barnard's-inn, Holborn.*
1863		Duncan, Capt. Francis, R.A., M.A., F.R.S. 32, *The Common, Woolwich, S.E.*
1861		*Duncan, George, Esq. 45, *Gordon-square, W.C.*
1840		*Dundas, Right Hon. Sir David, Q.C. 13, *King's-Bench-walk, Temple, E.C.; and Ochtertyre, Stirling.*
1860		Dunell, Henry James, Esq. 12, *Hyde-park-square, W.*
1873		Dunlop, Alexander Milne, Esq. 28, *Clanricarde-gardens, S.W.; and* 3, *Old Palace-yard, Westminster, S.W.*
1859		*Dunlop, R. H. Wallace, Esq., C.B., Indian Civil Service. *Northwood, near Rickmansworth, Herts.*
1860		*Dunmore, Charles Adolphus Murray, Earl of. 50, *Portland-place, W.*
1868	740	Dunn, Captain F. J. A. *Portillon, Tours, France.*
1867		Dunraven, Wyndham Thos., Earl of. *Clearwell-court, Coleford, Gloucestershire.*

Year of Election.		
1856		Duprat, Le Vicomte. *Consul-Général de Portugal*, 8, *St. Mary-Axe, E.C.*
1869		Durham, Edward, Esq. *Beauchamp-house, Kibworth, near Leicester.*
1865		*Dutton, F. S., Esq. *Reform Club, S.W.; and Adelaide, Australia.*
1868		Dutton, Frederick H., Esq. 45, *Dover-street, W.*
1870		Dymes, Daniel David, Esq. *Windham Club, S.W.; and* 9, *Mincing-lane, E.C.*
1872		Eade, Isaac Broad, Esq., M.A., &c. *Kimberley-house, Falmouth.*
1856		Eardley-Wilmot, Major-Gen. F., M.R.A. 22, *Victoria-road, Clapham-common, S.W.*
1871		Earle, Arthur, Esq. *Childwall-lodge, Wavertree, near Liverpool; and Windham Club, S.W.*
1869	750	Eastwick, Edward B., Esq., F.R.S. 38, *Thurloe-square, Brompton, S.W.*
1857		Eastwick, Captain W. J. 12, *Leinster-terrace, Hyde-park, W.*
1863		Eaton, F. A., Esq. *New University Club, St. James's-street, S.W.*
1862		*Eaton, H., Esq. 16, *Prince's-gate, Hyde-park, W.*
1862		*Eaton, Henry William, Esq., M.P. 16, *Prince's-gate, Hyde-park, W.*
1864		*Eaton, William Meriton, Esq., 16, *Prince's-gate, Hyde-park, W.*
1866		Eatwell, Surgeon-Major W. C. B., M.D. *Oriental Club, Hanover-square, W.*
1861		Eber, General F.
1862		Ebury, Lord. 107, *Park-street, Grosvenor-square, W.; and Moor-park, Herts.*
1872		Eddy, C. W., Esq. 7, *Queen's-gate-terrace, W.*
1862	760	Eden, Admiral Sir Charles, K.C.B. 9, *Queen's-gate-place, S.W.*
1858		Edge, Rev. W. J., M.A. *Benenden-vicarage, near Staplehurst, Kent.*
1874		Edgell, A. Wyatt, Esq. 11, *Portugal-street, W.*
1863		Edgeworth, M. P., Esq., BENG. C.S. *Mastrim-house, Anerley, S.*
1867		*Edward, James, Esq. *Balruddery, by Dundee, N.B.*
1866		*Edwardes, Thomas Dyer, Esq. 5, *Hyde-park-gate, Kensington, W.*
1871		*Edwardes, Thomas Dyer, Esq., jun. 5, *Hyde-park-gate, Kensington.*
1868		Edwards, Rev. A. T., M.A. 39, *Upper Kennington-lane, S.*
1865		Edwards, G. T., Esq., M.A. *Devon-lodge, Alexandra-road, N.W.*
1861		*Edwards, Henry, Esq., M.P. 53, *Berkeley-square, W.*
1871	770	Edwards, James Lyon, Esq. 7, *The Avenue, Belsize-park, Hampstead, N.W.*
1860		Edwards, Major J. B., R.E. *United Service Club, S.W. Care of Messrs. H. S. King and Co.*, 65, *Cornhill, E.C.*
1853		Egerton, Rear Admiral the Hon. Francis, M.P. *Devonshire-house, S.W.*
1868		Elder, A. L., Esq. *Carlisle-house, Hampstead.*
1863		*Elder, George, Esq. *Knock-castle, Ayrshire.*
1867		Eley, Charles John, Esq. *Old Brompton, S.W.*
1865		Elias, Ney, jun., Esq. 64, *Inverness-terrace, Bayswater, W.*
1870		Ellenborough, Lord. *Holly Spring, Bracknell, Berks.*

Year of Election.	
1860	Elliot, G., Esq., C.E. *The Hall, Houghton-le-Spring, near Fence Houses, Durham.*
1857	*Elliot, Capt. L. R. *La Mailleraye-sur-Seine, Seine Inférieure. Care of J. L. Elliot, Esq.*, 10, *Connaught-place, W.*
1871	780 Elliot, William, Esq. 2, *De Crespigny-terrace, Denmark-hill, Camberwell, S.*
1830	*Elliott, Rev. Charles Boileau, M.A., F.R.S. *Tattingstone, Suffolk.*
1873	Ellis, Hon. Evelyn H. *Raleigh Club, Regent-street, W.*
1865	Ellis, W. E. H., Esq. *Hasfield-rectory, Gloucester; Oriental Club, W.; and Byculla Club, Bombay.*
1871	Ellis, Walter J., Esq. 102, *Harley-street, Cavendish-square, W.*
1873	Elmslie, W. Stuart, Esq. *Lloyd's, E.C., and Richmond, S.W.*
1873	Elmslie, William Esq. *The Laurels, Richmond-hill, S.W.*
1858	Elphinstone, Major Sir Howard C., R.E., K.C.B., V.C., C.M.G. *Buckingham-palace, S.W.*
1869	Elsey, Colonel William. *West-lodge, Ealing, W.*
1857	Elton, Sir A. H., Bart. *Athenæum Club, S.W.; and Clevedon-court, Somersetshire.*
1873	790 Elton, Captain Frederick. *Care of Colonel Elton, Hendall-house, Red-hill, Surrey.*
1872	Elwell, W. R. G., Esq. 8, *Beverley-road, South Penge-park, S.E.*
1868	Ely, John Henry Wellington Graham Loftus, Marquis of. *Rathfarnham castle, Dublin.*
1862	*Emanuel, Harry, Esq. 11, *Hyde-park, Gardens, S.W.*
1873	Empson, Hy. Wm., Esq. *York.*
1863	Emslie, John, Esq. 47, *Gray's-inn-road, W.C.*
1830	Enderby, Charles, Esq., F.R.S., F.L.S. *Royal Institution, Albemarle-street, W.*
1860	Enfield, Edward, Esq., F.S.A. 19, *Chester-terrace, Regent's-park, N.W.*
1863	Engleheart, Gardner D., Esq. *Gatton-cottage, Reigate.*
1870	Erskine, Claude J., Esq., Bombay Civil Service. 87, *Harley-street, W.; and Athenæum Club, S.W.*
1852	800 Erskine, Admiral John Elphinstone. 1 *L, Albany, W.; and Lochend, Stirling, N.B.*
1857	*Esmeade, G. M. M., Esq. 29, *Park-street, Grosvenor-square, W.*
1872	Espinosa, Don Juan (Baron de Eldenburg). *Plaza del Inquisizion, Lima, Peru.*
1870	*Evans, Edward Bickerton, Esq. *Whitbourne-hall, near Worcester.*
1857	Evans, Captain F. J. O., R.N., C.B., F.R.S., F.R.A.S. 116, *Victoria-street, S.W.*
1830	*Evans, Vice-Admiral George. 1, *New-street, Spring-gardens, S.W.; and Englefield-green, Staines.*
1870	Evans, Lieut.-Colonel Henry Lloyd. 14, *St. James's-square, S.W.*
1857	Evans, Thos. Wm., Esq. 1, *Dartmouth-street, Westminster, S.W.; and Allestree-wall, Derby.*
1830	*Evans, W., Esq.
1867	Evans, W. Herbert, Esq. *Forde Abbey, Chard, Dorset.*
1865	810 Evans, Colonel William Edwyn. 55, *Seymour-street, Portman-square, W.*
1861	Evelyn, Lieut.-Colonel George P. 34, *Onslow-gardens, Brompton, S.W.*

Year of Election	
1851	*Evelyn, William J., Esq., F.S.A. *Evelyn Estate-office, Evelyn-street, Deptford.*
1830	*Everett, James, Esq., F.S.A.
1865	Everitt, George A., Esq. *Knowle-hall, Warwickshire.*
1874	Evill, William, Esq. *Lyncombe-house, St. John's-hill, Wandsworth.*
1873	Ewart, John, Esq. 7, *Lancaster-street, Hyde-park, W.*
1856	Ewing, J. D. Crum, Esq. 3, *Lime-street-square, E.C.*
1857	Eyre, Edward J., Esq.
1861	Eyre, George E., Esq. 59, *Lowndes-square, Brompton, S.W.*
1856	820 Eyre, Major-Gen. Sir Vincent, K.C.S.I. *Athenæum Club, S.W.; and* 33, *Thurloe-square, S.W.*
1871	Eyton, Wm. Campbell, Esq. *Care of Messrs. Peele and Peele, Shrewsbury.*
1873	Fair, John, Esq. 50, *Hamilton-terrace, St. John's-wood, N.W.*
1861	Fairbairn, Sir William, Bart., C.E., F.R.S. *Manchester.*
1870	Fairbridge, Charles, Esq., (Queen's Proctor). *Court of Vice-Admiralty, Cape Town.*
1869	Fairfax, Captain Henry, R.N. *Army and Navy Club, S.W.*
1856	Fairholme, George Knight, Esq. *Care of Mr. Ridgway,* 169, *Piccadilly, W.*
1870	Fairland, Edwin, Esq., M.D. (Surg. 21st Hussars). *Lucknow, Oude.*
1838	Falconer, Thomas, Esq. *Usk, Monmouthshire.*
1868	Falconer, William, Esq. 23, *Leadenhall-street, E.C.; and* 42, *Hilldrop-road, Camden-new-town, N.*
1857	830 Falkland, Lucius Bentinck, Viscount. *Shuttershelfe, Yorkshire.*
1871	Fane, Edward, Esq. 14, *St. James's-square, S.W.*
1855	*Fanshawe, Admiral E. G. 63, *Eaton-square, S.W.*
1873	Farmer, James, Esq. 6, *Porchester-gate, Kensington-gardens, W.*
1874	Farquhar, Walter, Esq. *Care of Messrs. Forbes, Forbes and Co.,* 9, *King William-street, E.C.*
1868	*Farquharson, Lieut.-Col. G. McB. *Care of Messrs. King and Co., Cornhill, E.C.*
1873	Farrar, R. Bishop, Esq. 33, *Abchurch-lane, E.C.*
1863	*Farrer, W. Jas., Esq. 18, *Upper Brook-street, W.*
1863	*Faunthorpe, Rev. J. P., M.A. *Training-college, Battersea.*
1869	Fawcett, Captain Edward Boyd, M.A. 8, *Windsor-crescent, St. Helier's, Jersey.*
1869	840 Fawcett, Henry, Esq. *Wainsford, Lymington.*
1874	Fawssett, Frederick, Esq., M.D. *Westgate, Louth, Lincolnshire.*
1853	*Fayrer, Joseph, Esq., M.D. 16, *Granville-place, Portman-square, W.*
1858	Fazakerley, J. N., Esq. 6, *South Eaton-place, S.W.*
1866	Felkin, William, Esq., jun., F.Z.S. 22, *Upper Talbot-street, Nottingham.*
1872	Fenner, William, Esq. *Thatched House Club, St. James's-street, S.W.; and* 3, *Den-crescent, Teignmouth, South Devon.*
1840	*Fergusson, James, Esq., F.R.S., D.C.L. 20, *Langham-place, W.*
1860	Ferro, Don Ramon de Silva.
1871	Festing, Captain Robert, R.E. *South Kensington Museum, S.W.*

Year of Election.		
1865		Field, Hamilton, Esq. *Thornton-lodge, Thornton-road, Clapham-park.*
1844	850	Findlay, Alex. George, Esq. 53, *Fleet-street, E.C.; and Dulwich-wood-park, S.*
1862		Finnis, Thomas Quested, Esq., Alderman. *Wanstead, Essex, N.E.*
1870		*Firth, John, Esq., J.P. *Care of Messrs. R. Buckland and Son, Hop-gardens, St. Martin's-lane.*
1863		Fisher, John, Esq. 60, *St. James's-street, S.W.*
1869		Fitch, Frederick, Esq., F.R.M.S. *Hadleigh-house, Highbury-new-park, N.*
1857		*Fitzclarence, Commander the Hon. George, R.N. 1, *Warwick-square, S.W.*
1872		Fitzgerald, A., Esq. *Junior St. James's Club, 74, St. James's-street, S.W.*
1861		Fitzgerald, Captain Keane. 2, *Portland-place, W.*
1873		Fitz-Gerald, R. U. Penrose, Esq. 110, *Eaton-square, S.W.*
1873		Fitz-James, Frank, Esq., C.E. 35 *Kensington-gardens-square, Bayswater, W.*
1864	860	Fitzpatrick, Lieut. Francis Skelton, 42nd Regiment, Madras Army.
1857		Fitzwilliam, The Hon. C. W., M.P. *Brookes's Club, St. James's-street, S.W.*
1837		*Fitzwilliam, William Thomas, Earl. 4, *Grosvenor-square, W.; and Wentworth-house, Rotherham, Yorkshire.*
1865		*Fitzwilliam, William S., Esq. 28, *Ovington-square, Brompton, S.W.*
1863		Fleming, G., Esq. *Brompton Barracks, Chatham.*
1861		*Fleming, John, Esq. 18, *Leadenhall-street, E.C.*
1865		Fleming, Rev. T. S. *The Vicarage, St. Clement's, Leeds.*
1853		*Flemyng, Rev. Francis P. *Lenzie, Glasgow.*
1862		Fletcher, John Charles, Esq. *Dale-park, Arundel; and Eaton-place, S.W.*
1857		Fletcher, Thomas Keddey, Esq. *Union-dock, Limehouse, E.*
1873	870	Foggo, Geo., Esq. *Oriental Club, W.*
1863		Foley, Major-Gen. the Hon. St. George, C.B. 24, *Bolton-street, W.*
1874		Folkard, A., Esq. *Thatched House Club, St. James's-street, S.W.*
1861		Foord, John Bromley, Esq. 52, *Old Broad-street, E.C.*
1860		Forbes, Commander Charles S., R.N. *Army and Navy Club, S.W. Care of Messrs. Woodhead.*
1863		Forbes, Capt. C. J. F. Smith.
1867		Forbes, Geo. Edward, Esq. *Colinton, Ipswich, Queensland; care of Messrs. Edenborough and Co., 54, Moorgate-street, E.C.; Union Club, S.W.; 11, Melville-street, Edinburgh; New Club, Edinburgh.*
1872		Forbes, Henry, Esq. *Angerston-grange, near Uley, Gloucestershire.*
1872		Forbes, James G. T. Esq., Staff-Surgeon R.N. *Royal Hospital, Greenwich.*
1873		Forbes, General Jno., C.B. *Inverernan, Strathdon, Aberdeenshire; and Forbes and Co., 12, Leadenhall-street, E.C.*
1860	880	Forbes, Lord, M.A. *Castle Forbes, Aberdeenshire.*
1873		Forbes, W. F., Esq. *Loch-cote-house, Bathgate, N.B.; and Castleton.*
1869		Ford, Col. Barnett (Governor of the Andaman Islands). 48, *Upper-park-road, Hampstead.*
1874		Forde, Henry Charles, Esq., C.E. *Ridjway-place, Wimbledon.*
1872		*Forrest, Alex. Esq., Survey Department of Perth. *Western Australia. Care of Messrs. Baker and Oliphant, 37, Walbrook, E.C.*

Year of Election.	
1873	Forshaw, Thomas, Esq. *The Bower, Bowdon, Cheshire.*
1868	Forster, Hon. Anthony. *Newsham-grange, Winston, Darlington, Durham.*
1839	*Forster, Right Hon. William Edward, M.P. 80, *Eccleston-square, S.W.; and Burley, near Otley.*
1867	Forsyth, T. Douglas, Esq., C.B. (B.C.S.), Commissioner, Jullundhur, Punjaub. *Care of Messrs. Sinclair, Hamilton, and Co., 17, St. Helen's-place, E.C.*
1861	Forsyth, William, Esq., M.P., Q.C. 61, *Rutland-gate, S.W.*
1861	890 *Fortescue, Hon. Dudley F. 9, *Hertford-street, Mayfair, W.*
1873	Foss, Edward William, Esq. *Trensham-house, Croydon.*
1873	Foss, G. Lush, Esq. *Ivy House, Southville, Bristol.*
1869	Foster, Ebenezer, Esq. 19, *St. James's-place, St. James's, S.W.*
1866	Foster, Edmond, jun., Esq. 79, *Portsdown-road, Maida-vale, W.*
1864	Foster, H. J., Esq.
1871	Foster, James Murray, Esq., L.M.D., F.R.C.P., F.S.A., &c. *Nazeerah, Assam, Bengal. Care of Joseph Foster, Esq., Collumpton, Devon.*
1873	Fowler, A. Grant, Esq. 3, *St. German's-place, Blackheath.*
1863	*Fowler, J. T., Esq. *Government Inspector of Schools, Adyar, Madras, India. Care of Rev. A. Wilson, National Society's Office, Sanctuary, Westminster.*
1872	*Fowler, John, Esq., C.E. *Thornwood Lodge, Campden-hill, W.*
1850	900 *Fowler, Robert N., Esq. M.A. 50, *Cornhill, E.C.; and Tottenham, N.*
1859	Fox, Lieut.-Colonel A. Lane. 10, *Upper Phillimore-gardens, Kensington, W.*
1866	Fox, D. M., Esq., Chief Engineer of the Santos and St. Paulo Railway. *St. Paulo, Brazil.*
1864	*Fox, Francis E., Esq., B.A. *Falmouth.*
1865	Fox, Samuel Crane, Esq. 31, *Cambridge-gardens, Notting-hill, W.*
1865	*Franks, Aug. W., Esq. 103, *Victoria-street, S.W.*
1860	Franks, Charles W., Esq. 2, *Victoria-street, S.W.*
1862	Fraser, Captain H. A., I.N. *Zanzibar. Care of Messrs. Grindlay.*
1874	Fraser, Jas. Grant, Esq., C.E. 9, *Great Queen-street, Westminster, S.W.*
1866	Fraser, Captain T. *Otago, New Zealand.*
1868	910 Frater, Alexander, Esq. *Canton. Care of James Frater, Esq., Town-house, Aberdeen.*
1873	Freeland, W., Esq. *Chichester.*
1868	Freeman, Henry W., Esq. *Junior Athenæum Club, S.W.*
1869	Freke, Thomas George, Esq. 1, *Cromwell-houses, Kensington, W.*
1863	Fremantle, Captain Edmund Robert, R.N. 4, *Upper Eccleston-street, S.W.*
1864	Freme, Major James H. *Wrentnall-house, Shropshire; and Army and Navy Club, S.W.*
1872	French, Colonel P. F. 14, *St. James's-square, S.W.*
1850	Frere, Bartle John Laurie, Esq. 45, *Bedford-square, W.C.*
1839	*Frere, George, Esq. 16, *Great College-street, S.W.*
1867	Frere, Right Hon. Sir Hy. Bartle Edw., P.C.K.C.B., G.C.S.I., D.C.L. *Wressil-lodge, Wimbledon, Surrey; and 22, Prince's-gardens, W.*
1842	920 Frere, William Edw., Esq., F.R.A.S. *The Rectory, Bitton, Gloucestershire.*

Year of Election.		
1869		*Freshfield, Douglas W., Esq. 6, *Stanhope-gardens, South Kensington, W.; and United University Club, S.W.*
1873		*Freshfield, W. Dawes, Esq. 64, *Westbourne-terrace, W.*
1872		Friedrichsen, Aug. Daniel, Esq. 76, *Jermyn-street, S.W.*
1863		Fuidge, William, Esq. 5, *Park-row, Bristol.*
1865		Fuller, Thomas, Esq. 119, *Gloucester-terrace, Hyde-park, W.; United University Club, S.W.*
1860		Fussell, Rev. J. G. Curry. 16, *Cadogan-place, S.W.; and Kiloskehane-castle, Templemore, Ireland.*
1868		Fyfe, Andrew, Esq., M.D. 112, *Brompton-road, S.W.*
1866		Fytche, Major-Gen. Albert, C.S.I. 21, *Lowndes-square, S.W.; and Reform Club, S.W.*
1863		*Gabrielli, Antoine, Esq. 6, *Queen's-gate-terrace, Kensington, W.*
1858	930	Gaisford, Thomas, Esq. *Travellers' Club, S.W.*
1872		Gale, Henry, Esq., C.E. 9, *Little Stanhope-street, Mayfair, W.*
1855		*Galloway, John James, Esq.
1869		Galsworthy, Frederick Thomas, Esq. 8, *Queen's-gate, Hyde-park, W.*
1873		Galsworthy, Robt. Herbert, Esq. 61, *Gloucester-place, Portman-square, W.*
1848		*Galton, Captain Douglas, R.E. 12, *Chester-street, Grosvenor-place, S.W.*
1850		*Galton, Francis, Esq., M.A., F.R.S. 42, *Rutland-gate, S.W.; and 5, Bertie-terrace, Leamington.*
1871		Galton, Theodore Howard, Esq. 78, *Queen's-gate; and Hadzor-ho., Droitwich.*
1854		*Gammell, Major Andrew. *Drumtochty, Kincardineshire, N.B.*
1873		*Gardiner, H. J., Esq. 6, *Orsett-terrace, Westbourne-terrace, W.*
1869	940	Gardner, Christopher T., Esq. *British Consulate, Canton.*
1865		Gardner, Captain G. H., R.N. 7, *James-street, Westbourne-terrace, W.*
1866		Gardner, John Dunn, Esq. 19, *Park-street, Park-lane, W.*
1863		Gascoigne, Frederic, Esq. *Parlington, Yorkshire.*
1859		*Gassiot, John P., jun., Esq. *The Culvers, Carshalton, Surrey.*
1866		Gastrell, Lieut.-Col. James E. (B. Staff Corps). *Surveyor-General's Office, Calcutta. Care of H. T. Gastrell, Esq.*, 36, *Lincoln's-inn-fields, W.C.*
1866		*Gatty, Charles H., Esq., M.A. *Felbridge-park, East Grinstead, Sussex.*
1873		Gawler, Colonel J. C. *Tower of London, E.C.*
1873		*Geiger, Jno. Lewis, Esq. 8, *Duke-street, St. James's, S.W.*
1870		*Gellatly, Edward, Esq. *Uplands, Sydenham.*
1865	950	George, Rev. H. B. *New College, Oxford.*
1859		Gerstenberg, Isidore, Esq. *Stockley-house, North-gate, Regent's-park, N.W.*
1866		*Gibb, George Henderson, Esq., 13, *Victoria-street, Westminster, S.W.*
1865		*Gibbons, Alderman Sir Sills John, Bart. *Calvert's-buildings*, 17, *Southwark-street, S.E.*
1859		*Gibbs, H. Hucks, Esq. *St. Dunstan's, Regent's-park, N.W.*

Year of Election.		
1873		Gibbs, James, Esq. *Cliftonville, Beckenham, Kent.*
1873		Gibbs, Jno. Dixon, Esq. *The Willows, Enjlefield-green, N.*
1870		Gibson, James Y., Esq. *Edinburgh. Care of Messrs. Williams and Norgate.*
1855		Gibraltar, Right Rev. and Hon. C. A. Harris, Bishop of. *Gibraltar Palace, Malta.*
1874		Gill, Lieutenant W. J., R.E. *Junior United Service Club, Charles-street, S.W.*
1855	960	Gillespie, Alexander, Esq. *Heathfield, Walton-on-Thames, Surrey.*
1866		*Gillespie, William, Esq. (*of Torbanc-hill*). 46, *Melville-street, Edinburgh.*
1868		*Gillett, Alfred, Esq. 60, *Eaton-square, S. W.; and Banbury, Oxon.*
1863		*Gillett, William, Esq. 20 *Belgrave-square, S. W.*
1861		Gilliat, Alfred, Esq.
1868		Gilliat, Algernon, Esq. 76, *Westbourne-terrace, Hyde-park, W.*
1863		Gillies, Robert, Esq., C.E. *Dunedin, Otago, New Zealand.*
1864		Gladstone, George, Esq. 35, *Ventnor-Villas, Cliftonville, Brighton.*
1863		Gladstone, J. H., Esq., PH.DR. 17, *Pembridge-square, W.*
1862		*Gladstone, Robert Stuart, Esq.
1864	970	*Gladstone, W. K., Esq. *Fitzroy-park, Highgate, N.*
1873		Glanville, Silvanus Young, Esq. 52, *Threadneedle-street, E.C.*
1872		Glass, James George Henry, Esq. 28, *London-street, Edinburgh. Care of Messrs. King and Co., 45, Pall-mall, S. W.*
1867		Glass, H. A., Esq. *St. Kilda, Vanbrugh-park, Blackheath, S.E.*
1857		Gleig, Rev. G. R., M.A. *Chaplain-General, Chelsea-hospital, S. W.*
1854		Glen, Joseph, Esq., Mem. Geogr. Soc. of Bombay. *Oriental Club, W.*
1857		Glover, Capt. John H., R.N. *Lagos.*
1866		Glover, Robert Reaveley, Esq. 30, *Great St. Helen's, E.C.*
1870		Glover, Colonel T. G., R.E. *Barwood, Hersham, near Esher, Surrey.*
1864		Glyn, Sir Richard George, Bart. *Army and Navy Club, S.W.*
1869	980	Goldney, G. Esq., M.P. 40, *Hill-street, Berkeley-square, W.*
1874		Goldsmid, Bartle, Esq. 32, *Nottingham-place, Marylebone, W.*
1868		Goldsmid, Sir Francis, Bart., M.P. *Inner-circle, Regent's-park, N.W.*
1863		Goldsmid, Maj.-Gen. Sir Frederic John, K.C.S.I., C.B. 1, *Southwell-gardens, South Kensington; and United Service Club, S. W.*
1861		Goldsmid, Julian, Esq. 49, *Grosvenor-street, S. W.*
1860		Gooch, Thomas Longridge, Esq. *Team-lodge, Saltwell, Gateshead-on-Tyne.*
1864		Goodall, George, Esq. *Messrs. Cox and Co., Craig's-court; and Junior Carlton Club, W.*
1863		*Goodenough, Captain J. G., R.N. *United Service Club, S. W.*
1864		*Goodenough, Lieut.-Col., R.A., *Care of Messrs. Cox and Co., Craig's-court, S. W.*
1871		*Goodwin, William, Esq. *Claughton-park, near Birkenhead.*
1865	990	*Goolden, Charles, Esq. *United University Club, S. W.*
1861		Gooldin, Joseph, Esq. 18, *Lancaster-gate, W.*
1856		*Gordon, Major-General the Hon. Sir Alexander H., K.C.B. 50, *Queen's-gate-gardens, South Kensington, W.*
1874		Gordon, Arthur Leo, Esq. *Wardhouse, Aberdeenshire; and 42, Duke-street, St. James's, S. W.*

Year of Election.	
1873	Gordon, J. Newall, Esq. H.B.M.'s Vice-Consul, Brazil. *Morro Velho, Minas Geraes, Brazil.*
1870	Gordon, Russell Manners, Esq. 38, *Alpha-road, St. John's-wood, N.W.*
1866	Gore, Augustus F., Esq., Colonial Secretary. *Demerara.*
1853	Gore, Richard Thomas, Esq. 6, *Queen-square, Bath.*
1859	Gosling, Fred. Solly, Esq. 23, *Spring-gardens, S.W.*
1862	Goss, Samuel Day, Esq., M.D. 111, *Kennington-park-road, S.*
1870	1000Gottlieb, Felix Henry, Esq., J.P. *Singapore, East Indies.*
1868	Gough, Hugh, Viscount, F.L.S. *Lough Cutra Castle, Gort, Co. Galway.*
1835	Gould, Lieut.-Colonel Francis A. *Buntingford, Herts.*
1873	Gould, Rev. Jas. Aubrey. *Buckingham-palace-hotel, W.*
1846	Gould, John, Esq., F.R.S., F.L.S. 26, *Charlotte-street, Bedford-square, W.C.*
1870	Gould, Rev. Robert John. *Stratfield Mortimer, near Reading.*
1872	Gourley, Colonel E., M.P. *Care of J. J. Stephens, Esq*, 1, *St. Mary-axe, E.C.*
1872	Gowlland, Staff-Commander John Thomas. *Admiralty Survey, Sydney, New South Wales. Care of Captain Davis, Hydrographic-office, Admiralty, S.W.*
1867	Grabham, Michael, Esq., M.D. *Madeira. Care of C. R. Blandy, Esq.*, 25, *Crutched-friars, E.C.*
1868	Graeme, H. M. S., Esq.
1869	1010Graham, Andrew, Esq., Staff Surg. R.N. *Army and Navy Club, S.W.*
1858	Graham, Cyril C., Esq. 9, *Cleveland-row, St. James's, S.W.; and Debroe-house, Watford, Herts.*
1874	Graham, James Henry Stuart, Esq. 1 *Belgrave-road, Shepherd's-bush.*
1871	Graham, J. C. W. Paul, Esq. 1, *Carlisle-place, Victoria-street, S.W.; and Brookes's Club, St. James's-street, S.W.*
1868	*Graham, Thomas Cuninghame, Esq. *Carlton Club, S.W.; and Dunlop-house, Ayrshire.*
1870	*Grant, Andrew, Esq. *Oriental Club, Hanover-square, W.*
1863	*Grant, C. Mitchell, Esq. 15, *George-street, Hanover-square.*
1861	Grant, Daniel, Esq.
1865	*Grant, Francis W., Esq. *Army and Navy Club, S.W.*
1860	Grant, Lieut.-Col. James A., C.B., C.S.I. *E. India U. S. Club, S.W.; and* 7, *Park-square, Regent's-park, N.W.; and Balavil, Dingwall, N.B.*
1862	1020Grant, Lieutenant J. Murray, Inspector Cape Frontier Police, Cape of Good Hope. *Care of Messrs. Ridgway, Waterloo-place, S.W.*
1873	Grant, Colonel W. Francis. *L* 6, *Albany, W.*
1867	Graves, Rev. John. *Underbarrow-parsonage, Milnthorpe, Westmoreland.*
1872	Gray, Andrew, Esq. 1, *Lime-street-square, E.C.*
1870	Gray, Charles W., Esq. 19, *Regent's-park-road, N.W.*
1830	*Gray, John Edw., Esq., PH. DR., F.R.S., Z.S. and L.S. *British Museum, W.C.*
1871	Gray, Mathew, Esq. *St. John's-park, Blackheath, S.E.*
1873	Gray, Robert Kaye, Esq. *St. John's-park, Blackheath.*

Year of Election.	
1868	Gray, Lieut.-Col. William. 26, *Prince's-gardens, W.; and Darcy Lever-hall, near Bolton.*
1862	Greathed, Lieut.-Colonel Wilberforce, W. H., C.B. 7, *Queen-street, Mayfair, W.*
1863	1030Greaves, Rev. Richard W. 1, *Whitehall-gardens, S. W.*
1861	Green, Captain Francis, 58th Regiment.
1871	Green, John Henry, Esq. 8, *Weighton-road, South Penge-park, S.E.*
1871	Green, Joseph E., Esq. 12A, *Myddelton-square, E.C.*
1868	Green, Rev. W., M.A. *Chaplain to the Tower of London.*
1869	Green, Colonel Sir W. H. R., K.C.S.I., C.B. 36, *St. George's-road, Eccleston-square, S.W.*
1871	Greene, Captain John Clinton, R.A.
1874	Greenfield, Thomas Challen, Esq. 84, *Basinghall-street, E.C.; and* 6, *Outram-villas, Addiscombe.*
1857	*Greenfield, W. B., Esq. 59, *Porchester-terrace, Hyde-park, W.; and Union Club, S.W.*
1870	Greenup, W. Thomas, Esq. *Woodhead-road, London-road, Sheffield.*
1871	1040Greg, Thomas, Esq. 8, *Eaton-square, S.W.*
1865	Greg, W. R., Esq., Comptroller of H.M.S. Stationery Office. *Wimbledon, S.W.*
1858	*Gregory, Augustus Charles, Esq. *Surveyor-General, Brisbane, Queensland, Australia.*
1858	Gregory, Charles Hutton, Esq., C.E. 1, *Delahay-street, Westminster, S.W.*
1860	*Gregory, Francis Thomas, Esq. *Queensland.*
1858	*Gregory, Isaac, Esq. *Merchants'-college, Blackpool.*
1872	Gregson, George, Esq. 26, *Harley-street, Cavendish-square, W.*
1857	Grellet, Henry Robert, Esq. *Care of L. Mentzendorff, Esq.,* 87, *Great Tower-street, E.C.*
1865	*Grenfell, Henry R., Esq., M.P. 15, *St. James's-place, S.W.*
1830	*Greswell, Rev. Richard, M.A., F.R.S. 39, *St. Giles's-street, Oxford.*
1866	1050Grey, Charles, Esq. 13, *Carlton-house-terrace, S.W*
1837	*Grey, Sir George, K.C.B. *Grosvenor-mansions, S.W.*
1873	Grey, Captain H. (Bengal Staff Corps). 4 *Foulis-terrace, W.*
1864	Grierson, Charles, Esq. *Care of W. Grierson Jackson, Esq.,* 12, *Surrendale-place, Sutherland-gardens, W.*
1868	Griffin, Daniel, Esq. 18, *Leadenhall-street, E.C.*
1861	*Griffith, Daniel Clewin, Esq. 20, *Gower-street, W.C.*
1839	Griffith, John, Esq. 16, *Finsbury-place-south, E.C.*
1863	Griffith, Sir Richard. *Henderoyde-park, Kelso, N.B.*
1836	Griffith, Richard Clewin, Esq. 20, *Gower-street, W.C.*
1872	Griffiths, Arthur Edward, Esq. 25, *Talbot-square, Hyde-park, W.*
1867	1060Griffiths, Captain A. G. F., 63rd Reg. (Major of Brigade, Gibraltar). *St. Mary's-vale, Chatham.*
1869	Griffiths, William, Esq., J.P. 24, *Great Cumberland-place, W.; and The Welkin, Lindfield, Sussex.*
1855	Grindrod, R. B., Esq., M.D., LL.D., F.L.S., &c. *Townsend-house, Malvern.*

Year of Election.	
1872	Grinlinton, J. J., Esq. *Colombo, Ceylon. Care of Edward Woods, Esq.*, C.E., 3, *Storey's-gate, Westminster, S.W.*
1861	Grosvenor, Lord Richard, M.P. 33, *Upper Grosvenor-street, W.*
1857	Gruneisen, Charles Lewis, Esq. 16, *Surrey-street, Strand, W.C.*
1861	Gunnell, Captain Edmund H., R.N. *Army and Navy Club, S.W.; and* 21, *Argyll-road, Campden-hill, W.*
1859	*Gurney, John H., Esq. *North Repps, Norwich.*
1857	Gurney, Samuel, Esq. 20, *Hanover-terrace, Regent's-park, N.W.*
1872	*Gwynne, James Eglinton W., Esq., C.E., F.S.A., J.P., &c. 97, *Harley-street, W.; and Cliff-house, Dovercourt, Essex.*
1865	1070Gwyther, John H., Esq. *Meadowcroft, Lower Sydenham, S.E.*
1870	Habicht, Claudius Edward, Esq. 38, *Eaton-square, S.W.*
1863	Hadfield, William, Esq. 11, *Inverness-road, W.*
1865	Hadley, Henry, Esq., M.D. *Needwood-lodge, Bay's-hill, Cheltenham.*
1863	Hadow, P. D., Esq. *Sudbury-priory, Middlesex.*
1865	Halcombe, Rev. J. J. *Charterhouse, E.C.*
1868	Hale, Rev. Edward, M.A. *Eton College; and United University Club, S.W.*
1860	Haliday, Lieut.-Colonel William Robert. *United Service Club, S.W.*
1853	Halifax, Viscount, G.C.B. 10, *Belgrave-sq., S.W.; and Hickleton, Yorkshire.*
1853	*Halkett, Rev. Dunbar S. *Little Bookham, Surrey.*
1853	1080*Halkett, Commander Peter A., R.N.
1861	Hall, Charles Hall, Esq. *Watergate-house, Emsworth.*
1863	Hall, Henry, Esq. 109, *Victoria-street, S.W.*
1869	*Hall, James MacAlester, Esq. 15, *Woodside-crescent, Glasgow.*
1862	Hall, James Tebbutt, Esq. *Fore-street, Limehouse, E.*
1871	Hall, Admiral Robert, C.B. 38 *Craven-hill-gardens, W.; and Admiralty, S.W.*
1863	Hall, Thomas F., Esq., F.C.S. 29, *Warwick-square, S.W.*
1853	Hall, Admiral Sir William Hutcheson, K.C.B., F.R.S. *United Service Club, S.W.; and* 48, *Phillimore-gardens, Kensington, W.*
1865	Hallett, Lieut. Francis C. H., R.H.A.
1858	Halloran, Arthur B., Esq. 3, *Albert-terrace, St. Leonard's, Exeter.*
1872	1090*Halpin, Capt. R. C. 38, *Old Broad-street, E.C.*
1871	*Hamilton, Andrew, Esq., Lieut. 102nd Regiment. *The House of Falkland, Fyfe; and Naval and Military Club, W.*
1862	Hamilton, Archibald, Esq. *South Barrow, Bromley, Kent, S.E.*
1861	Hamilton, Lord Claude, 19, *Eaton-square, S.W.; and Barons-court, County Tyrone.*
1830	*Hamilton, Captain Henry G., R.N. 71, *Eccleston-square, S.W.*
1869	Hamilton, Captain Richard Vesey, R.N. *Keyham, Devonport.*
1861	Hamilton, Col. Robert William, Grenadier Guards. 103, *Eaton-square, S.W.*
1863	Hamilton, Rowland, Esq. *Oriental Club, W.*
1830	Hamilton, Terrick, Esq. 121, *Park-street, Grosvenor-square, W.*
1872	Hamilton, Walter, Esq. 48, *Sydney-street, Brompton, S.W.*

Year of Election.	
1846	1100 Hamilton, Rear-Admiral W. A. Baillie. *Macartney-house, Blackheath, S.E.*
1853	Hampton, Lord, F.R.S. 41, *Eaton-square, S.W.; and Westwood-park, Droitwich, Worcestershire.*
1853	*Hand, Admiral George S., C.B. *U. S. Club, S.W.; and H.M.S. 'Victory.'*
1860	*Handley, Benjamin, Esq. *Lima, Peru; and 74, Market-place, Sheffield.*
1874	Handley, Captain Francis (late I.N.). 101, *Sloane-street, S.W.*
1866	Hanham, Commr. T. B., R.N. *Manston-house, near Blandford, Dorset.*
1861	*Hankey, Blake Alexander, Esq.
1874	Hankey, Reginald, Esq. 71, *Chester-square, S.W.; and Arthur's Club, S.W.*
1870	*Hankey, Rodolph Alexander, Esq. 54, *Warwick-square, S.W.*
1857	Hankey, Thomson, Esq. 45, *Portland-place, W.*
1837	1110 *Hanmer, Lord, F.R.S. 59, *Eaton-place, S.W.; and Hanmer-hall and Bettisfield-park, Flintshire.*
1874	Harberton, Viscount. 60, *Rutland-gate, S.W.*
1859	*Hansard, Henry, Esq. 13, *Great Queen-street, W.C.*
1870	Harbord, John B., Esq., M.A., Chaplain R.N. 69, *Victoria-park-road, E.*
1840	*Harcourt, Egerton V., Esq. *Whitwell-hall, York.*
1864	*Hardie, Gavin, Esq. 113, *Piccadilly, W.*
1864	Harding, Major Charles. *Grafton Club*, 10, *Grafton-street, Piccadilly, W.*
1864	Harding, J. J., Esq. 1, *Barnsbury-park, Islington, N.*
1864	Hardinge, Capt. E., R.N. 32, *Hyde-park-square, W.*
1861	Hardinge, Henry, Esq., M.D. 18, *Grafton-street, Bond-street, W.*
1871	1120 *Hargrave, Joseph, Esq. *Fort Garry, Winnipeg, Manitoba, Canada. Care of the Hudson Bay Company*, 1, *Lime-street, E.C.*
1873	Harley, Colonel R. W., C.B. *Junior United Service Club, Chandos-street, W.*
1868	Harper, J. A. W., Esq. 23, *Grosvenor-road, Pimlico, S.W.; and Lloyd's, E.C.*
1873	Harper, W. H., Esq. *New Shoreham, near Brighton.*
1853	Harris, Admiral the Hon. Sir E. A. J., K.C.B. *H.B.M.'s Envoy Extraordinary and Minister Plenipotentiary, The Hague, Holland. Messrs. Woodhead.*
1869	Harris, Capt. G. F., 20th Regt. 48, *Lansdown-road, Dublin.*
1859	Harris, Capt. Henry, H.C.S. 35, *Gloucester-terrace, Hyde-park, W.*
1871	Harris, Edwd., Esq. *Rydal-villa, Longton-grove, Upper Sydenham.*
1865	Harris, John M., Esq. *Yelbanas, Anerley-road, S.*
1874	Harris, Reader, Esq. *Temple Club, Arundel-street, Strand, W.C.*
1863	1130 Harrison, Charles, Esq. 3, *Great Tower-street, E.C.*
1870	Harrison, Charles, Esq. 10, *Lancaster-gate, W.*
1865	*Harrison, William, Esq., F.S.A., F.G.S., &c. *Conservative Club, S.W.; Royal Thames Yacht Club*, 7, *Albemarle-street, W.; and Samlesbury-hall, near Preston, Lancashire.*
1838	Harrowby, Dudley, Earl of, F.R.S. *Sandon-house, Lichfield; and Norton, Gloucestershire.*
1872	Harston, Edward F. B., Esq. 14, *Mecklenburgh-square, W.C.*
1872	Hart, Frederick Ralph, Esq., F.R.S.A., Membre de la Société de Géographie de Paris, &c.; Mem. Pure Literature Soc., London. *Government House, Trinidad, British West Indies; and* 32, *Westbourne-park-road, W.*

Year of Election.	
1872	Hart, Henry Neville, Esq. 107, *Harley-street, W.*
1868	*Hart, J. L., Esq. 20, *Pembridge-square, W.*
1854	*Hartland, F. Dixon-, Esq., F.S.A., &c. 14, *Chesham-place, S.W.; and the Oaklands, near Cheltenham.*
1863	Harvey, Charles, Esq. *Rathgar-cottage, Streatham, S.*
1865	1140Harvey, C. H., Esq., M.D. 18, *Colville-square, W.*
1867	Harvey, James, Esq. (Solicitor). *Esk-street, Invercargill, Southland, New Zealand. Care of the Bank of Otago, Old Broad-street, E.C.*
1864	Harvey, John, Esq. *Ickwell Bury, Biggleswade.*
1864	Harvey, John, Esq. 7, *Mincing-lane, E.C.*
1869	Harvey, John, Esq., LL.D. *Château Deslyons, Boulogne-sur-Mer.*
1866	Harvey, Richard M., Esq. 13, *Devonshire-street, Portland-place, W.*
1864	Harvey, W. D., Esq. *Holbrooke-house, Richmond.*
1871	Harvie, Edgar Christmas, Esq. *City of London Club, Old Broad-street.*
1873	Harwood, S., Esq. *Hamilton-house, Leamington.*
1873	Hatherton, Lord. *Teddesley-park, Penkridge, Staffordshire.*
1873	1150Hawker, Geo. Esq. 9A, *Porchester-terrace, W.*
1858	Hawker, Edward J., Esq. 37, *Cadogan-place, S.W.*
1834	Hawkins, Francis Bisset, Esq., M.D., F.R.S. 146, *Upper Harley-street, W.; and Lewell-lodge, Dorchester.*
1840	*Hawkins, John, Esq.
1858	*Hawkins, Colonel J. Summerfield, R.E. *The Castle, Dublin.*
1873	Hawkins, Rev. W. Bentinck L., F.R.S. 33, *Bryanston-square, W.*
1861	Hawksley, Thomas, Esq., C.E. 14, *Phillimore-gardens, Kensington, S.W.*
1871	Hay, Andrew, Esq. *Oriental Club, Hanover-square, S.W.; and Bombay.*
1852	*Hay, Rear-Admiral Sir J. C. Dalrymple, Bart., M.P., F.R.S. 108, *St. George's-square, S.W.; U. S. Club, S.W.; Dunrajit, Glenluce; and Harrow-on-the-hill, N.W.*
1863	*Hay, Rear-Admiral Lord John, M.P., C.B. 15, *Cromwell-road, South Kensington, W.*
1865	1160Hay, Lord William. *B 5, Albany, W.*
1872	Hay, Jno. Ogilvy, Esq. (Hon. Magist. and J. P. Brit. Burmah). *Rangoon; and care of Messrs. Hay, Ingram and Co, 79, Great Tower-street, E.C.*
1872	Haydon, G. H., Esq. *Bethlehem Hospital, S.E.*
1870	Haynes, Stanley L., Esq., M.D. *Malvern-link, Worcestershire.*
1868	Haysman, David, Esq. *Portway-house, Weston, Bath.*
1862	Head, Alfred, Esq. 13, *Craven-hill-gardens, Bayswater, W.*
1871	Head, Henry, Esq. *Stoke Newington, N.*
1871	Head, Geo. T., Esq. *East-cliff-house Grammar-school, Margate.*
1863	Headlam, Right Hon. Thomas E., M.P. 27, *Ashley-place, Victoria-street, S.W.*
1874	Heard, Dr. Samuel S. *Derrigimi-castle, Kenmare, Ireland; and* 14, *St. James's-square, S.W.*
1856	1170Heath, The Baron, F.R.S., F.S.A. 31, *Old Jewry, E.C.*
1863	Heathfield, W. E., Esq. *Arthur's Club, S.W.*

Year of Election.	
1861	Hector, Alexander, Esq.
1861	Hector, James, Esq., F.R.S., M.D. *Care of E. Stanford, Esq.*
1873	Heeley, W. E., Esq. *New Travellers' Club, George-street, W.*
1871	Heinemann, N., Esq., PH.D. 21, *York-place, Portman-square, W.*
1872	*Helme, Richard, Esq. *Walthamstow, Essex.*
1862	Hemans, Geo. Willoughby, Esq., C.E. *Westminster-chambers, Victoria-street, S.W.*
1870	Henderson, David Mitchell, Esq. 1, *Carden-place, Aberdeen; and Old Calabar, W. Africa.*
1871	*Henderson, G., Esq., M.D., F.L.S. *Care of Messrs. King and Co., Pall-mall, W.*
1853	1180 Henderson, John, Esq. 2, *Arlington-street, Piccadilly, W.*
1866	Henderson, Patrick, Esq. *Care of George Reid, Esq.*, 21, *Abchurch-lane, E.C.*
1852	Henderson, William, Esq. 5, *Stanhope-street, Hyde-park-gardens, W.*
1844	*Heneage, Edward, Esq. *Stag's-end, Hemel Hempstead.*
1861	Henn, Rev. J., B.A., Head Master of the Manchester Commercial Schools. *Old Trafford, Manchester.*
1860	Hennessey, J. B. N., Esq. 1st *Asst. Trig. Survey of India, Dehra in the Dhoon, N.W. Provinces, India. Care of Messrs. H. S. King and Co.*
1838	*Henry, Wm. Chas., Esq., M.D., F.R.S. *Haffield, near Ledbury, Herefordshire.*
1861	*Henty, Douglas, Esq. *Chichester.*
1870	Hepworth, Campbell, Esq. 2, *St. James's-square, Cheltenham.*
1872	Herbert, Charles E., Esq. *Rawulpindee, Punjab. Care of Messrs. King and Co.*, 65, *Cornhill, E.C.*
1857	1190 Herd, Captain D. J. 2, *Norway-house, Limehouse, E.*
1858	Hertslet, Edward, Esq. *Librarian, Foreign-office, S.W.; and Belle-vue-house, Richmond, S.W.*
1871	Hertslet, Geo. Thos., Esq. *Lord Chamberlain's-office, St. James's-palace, S.W.*
1861	Heugh, John, Esq. *Tunbridge-wells.*
1873	Hewitt, Richard, Esq. 3, *Princes-square, Bayswater, W.*
1840	*Heywood, James, Esq., F.R.S. *Athenæum Club, S.W.; and* 26, *Kensington-palace-gardens, W.*
1869	Heywood, Samuel, Esq. 171, *Stanhope-street, Hampstead-road, N.W.*
1860	Heyworth, Capt. Lawrence, 4th Royal Lancashire. *Junior United Service Club, S.W.*
1867	Higgins, Edmund Thomas, Esq., M.R.C.S. 122, *King Henry's-road, Haverstock-hill, N.*
1856	Hill, Arthur Bowdler, Esq. *South-road, Clapham-park, Surrey, S.*
1872	1200 Hill, Clement L., Esq. *Foreign-office, S.W.*
1873	Hill, Henry, Esq. 122, *Leadenhall-street, E.C.*
1854	Hill, Lieut.-Colonel Stephen J., C.B., Governor of Antigua. *Army and Navy Club, S.W. Care of Capt. E. Barnett*, R.N., 14, *Woburn-square, W.*
1872	Hill, Samuel, Esq., M.D. 22, *Mecklenburgh-square, W.C.*
1874	Hills, Lieut.-Colonel James, V.C., R.A. 14, *St. James's-square, S.W.*
1858	Hinchliff, T. Woodbine, Esq., Barrister-at-Law. 64, *Lincoln's-inn-fields, W.C.*
1862	*Hinde, Samuel Henry, Esq. *Windham Club, S.W.*

Year of Election.	
1846	*Hindmarsh, Frederick, Esq. 4, *New-inn, Strand, W.C.*
1873	Hirst, William Henry, Esq. 103, *Mottrary-road, Staleybridge, Cheshire.*
1873	Hirth, Dr. F. *Imperial Customs, China.*
1870	1210Hitchins, Capt. T. M., R.A. *Hull.*
1872	*Hoare, Henry, Esq. (Banker). *Hoare's Bank, Fleet-street; and St. James's-square, S.W.*
1868	Hoare, Samuel, Esq., M.A. *Parkbury, St. Alban's.*
1855	Hohbs, Wm. Geo. Ed., Esq. *Beulah-cottage, London-road, Enfield, N.*
1868	Hobson, Stephen James, Esq. 32, *Nicholas-lane, Lombard-street; and* 10, *Regent's-park-road, N.W.*
1872	Hockin, Charles, Esq., M.A. 8, *Avenue-road, St. John's-wood, N.W.*
1869	Hodges, Henry, Esq. *Brondesbury-lodge Collegiate-school, Kilburn.*
1856	*Hodgson, Arthur, Esq. *Clapton-house, near Stratford-on-Avon.*
1871	*Hodgson, Henry Tylston, Esq. *Harpenden, St. Albans.*
1861	*Hodgson, James Stewart, Esq. 8, *Bishopsgate-street, E.C.*
1857	1220Hodgson, Kirkman Daniel, Esq., M.P. 8, *Bishopsgate-street, E.C.*
1869	*Hodgson, William H., Esq. *Treasury-chambers; and* 1, *Whitehall-gardens, S.W.*
1868	Holdich, Lieut. Thos. Hungerford, R.E.
1839	*Holford, Robert S., Esq. *Dorchester-house, Park-lane, W.*
1867	Holland, Rev. Fred. Whitmore. *Evesham, Worcester.*
1861	Holland, Colonel James. *Southside, The Park, Upper Norwood, S.E.*
1863	Holland, Loton, Esq. *The Gables, Osborne-road, Windsor.*
1862	Holland, Robert, Esq. *Stanmore-hall, Great Stanmore, Middlesex.*
1873	Holland, Lieut. Swinton D., R.N. *Dumbleton, Evesham.*
1871	Hollingworth, Hy. Geo., Esq. *Kiu Kiang, China; and Chestnut-grove, Wavertree, Liverpool.*
1861	1230Holme, J. Wilson, Esq., M.A. *Downswood, Beckenham, Kent, S.E.*
1839	*Holroyd, Arthur Todd, Esq., M.D., F.L.S. *Master's-office, Sydney, New South Wales. Care of Edgar Howell, Esq.,* 3, *St. Paul's-churchyard, E.C.*
1857	Holroyd, Henry, Esq., Barrister-at-Law. 2, *Elm-court, Temple, E.C.*
1867	*Holstein, The Marquez de Souza. *Lisbon. Care of Messrs. Kraentler and Micville,* 12, *Angel-court, E.C.*
1869	Holt, George, Esq. *Union-street, Willenhall.*
1871	Holt, Henry T. W., Esq. 6, *King's-road, Clapham-park; King and Co., Cornhill.*
1872	Holt, Lieut. Sydney A., R.N. *Care of Messrs. Hildreth and Ommanney,* 41, *Norfolk-street, Strand, W.C.*
1864	Holt, Vesey, Esq. 17, *Whitehall-place, S.W.*
1873	Home, Capt. Robert, R.E. 25, *Kidbrook-road, Blackheath, S.E.*
1857	Homfray, William Henry, Esq. 6, *Storey's-gate, S.W.*
1864	1240*Hood, Sir Alex. Acland, Bart. *St. Andrie's-park, Bridgwater, Somerset.*
1873	*Hood, F. Jacomb, Esq. *Conservative Club, S.W.*
1862	Hood, Henry Schuback, Esq. *War-office, S.W.; and* 10, *Kensington-park-gardens, W.*

Year of Election.	
1866	*Hooker, Joseph, Esq., C.B., M.D., F.R.S., F.L.S., &c. *Director of the Royal Gardens, Kew.*
1868	Hooper, Alf., Esq. *City of London Club, Old Broad-street, E.C.*
1870	Hooper, George Norgate, Esq. 139, *King Henry's-road, Adelaide-road, N.W.*
1870	Hooper, Rev. Robert Poole. 29, *Cambridge-street, Brighton.*
1861	Hopcraft, George, Esq. 3, *Billiter-square, E.C.*
1846	*Hope, Alex. James Beresford, Esq., M.P. *Arklow-house, Connaught-place, Hyde-park, W.; and Bedgebury-park, Hurst-green, Kent.*
1862	Hope, Capt. C. Webley, R.N. *H.M.S. 'Brisk,' Australia; Messrs. Hallett & Co.*
1874	1250Hope, Percy, Esq. *Mosely-buildings, Manchester.*
1869	Hopkins, Capt. David, M.A.I. *New Calabar, near Bonny, W. Africa. Care of Company of African Merchants, 6, Water-street, Liverpool.*
1870	*Hopkins, Edward M., Esq. 66, *Great Cumberland-place, Hyde-park, W.*
1871	Hornby, Rev. James John, D.D. *Head Master of Eton College.*
1871	Horne, Francis, Esq. *Berrybands, Surbiton.*
1869	Horrex, Theophilus, Esq. 18, *Connaught-square, Hyde-park, W.*
1868	Horton, James Africanus B., Esq., M.D., &c. *Care of Messrs. McGrigor and Co., 25, Charles-street, S.W.*
1870	Hoseason, Captain John C., R.N. *United Service Club, S.W.*
1861	Hoskins, Capt. A. H., R.N. *Army and Navy Club, S.W. Care of Messrs. Woodhead.*
1853	Houghton, Lord, D.C.L., F.R.S. *Travellers' Club, S.W.; The Hall, Bawtry; and Fryston-hall, Ferrybridge, Yorkshire.*
1856	1260Hovell, William Hilton, Esq. *Goulburn, New South Wales. Care of Mr. W. Chamberlin, 74, Fleet-street, E.C.*
1869	Howard, John, Esq., C.E. *Exmouth, Devon.*
1873	Howard, Morgan, Esq. *Temple, E.C.*
1857	Howard, Samuel Lloyd, Esq. *Goldings, Loughton, Essex.*
1873	Howard, William, Esq. 3, *Roslyn-bank, Lyndhurst-road, Hampstead, N.W.*
1842	*Hubbard, J. Gellibrand, Esq., M.P. 24, *Prince's-gate, Hyde-park, W.*
1867	*Hubbard, William Egerton, Esq. 63, *Eaton-square, S.W.*
1867	*Hubbard, William Egerton, Esq., jun. 63, *Eaton-square, S.W.*
1871	*Hudleston, Wilfred, Esq. 23, *Cheyne-walk, S.W.*
1872	Hudson, Jno., Esq. 5, *Crosby-square, E.C.; and Thatched House Club, St. James's, S.W.*
1870	1270Hudson, George B., Esq. *Frogmore-hall, Hertford. New University Club, St. James's-street, S.W.*
1857	Hughes, Captain Sir Frederic. *Ely-house, Wexford.*
1873	Hughes, James, Esq. 328, *Camden-road, N.*
1838	Hughes, William, Esq. 8, *Devonshire-terrace, Kensington, W.*
1838	*Hume, Edmund Kent, Esq.
1868	Hunt, John Percival, Esq., M.D. 78, *Grosvenor-road, Highbury-new-park, N.*
1874	Hunt, William Thomas, Esq. 1, *Pembridge-villas, Bayswater, W.*
1868	Hunter, Major Edward. *Junior United Service Club, S.W.*

Year of Election.	
1862	Hunter, Henry Lannoy, Esq. *Beech-hill, Reading.*
1872	Hunter, W. W. Esq., LL.D. *Bengal.*
1870	1280Hutchins, Edward, Esq. 10, *Portland-place, W.*
1871	Hutchins, F. Leigh, Esq. *Eltham, Kent, S.E.*
1873	Hutchins, Geo. Albert, Esq. *Felsted Pen, Spanish Town, Jamaica. Care of M. Beazeley, Esq.* C.E. *Trinity Works, Penzance.*
1871	*Hutchinson, Major Alexr. Hadden, R.A., F.G.S., Garrison Instructor.
1872	Hutchinson, Edward, Esq. 8, *Sumner-place, South Kensington, W.*
1864	Hutchinson, Capt. R. R. *Junior St. James's Club, St. James's-street, S.W.*
1858	Hutchinson, Thomas J., Esq., F.R.S.L., F.E.S., F.A.S.L., H.B.M. Consul, *Callao, Peru.*
1870	*Hutton, Charles W. C., Esq. *Belair, Dulwich, S.*
1860	*Hyde, Captain Samuel. 8, *Billiter-square, E.C.*
1865	Illingworth, Rev. Edward A. *Care of F. Illingworth, Esq., Union Bank, Argyll-place, W.*
1852	1290Illingworth, Richard Stonhewer, Esq. 9, *Norfolk-crescent, Hyde-park, W.*
1850	*Imray, James Frederick, Esq. 89, *Minories, E.; and Beckenham, Kent, S.E.*
1861	*Ingall, Samuel, Esq. *Forest-hill, Kent, S.E.*
1851	Inglefield, Admiral Edward A., C.B., F.R.S. *United Service Club, S.W.; and* 10, *Grove-end-road, St. John's-wood, N.W.*
1871	Inglis, Commander Charles D., R.N. 7, *Albemarle-street, W.*
1846	Ingram, Hughes Francis, Esq. *University Club, S.W.*
1860	*Inskip, Staff Commander G. H., R.N. *H.M. Surveying Vessel 'Porcupine;' and* 9, *Torrington-villas, High-road, Lee, S.E.*
1852	*Inskip, Rev. Robert Mills, C.B. 57, *Coburg-street, Plymouth.*
1840	*Irby, Frederick W., Esq. *Athenæum Club, S.W.*
1870	Irvine, James, Esq. 18, *Devonshire-road, Claughton, Cheshire.*
1864	1300*Irving, John, Esq. *Care of Messrs. Elsworth and Sons, 4, Corbet-court, Gracechurch-street, E.C.*
1861	Irwin, James V. H., Esq. 4, *Boscovel-gardens, Regent's-park, N.W.*
1873	Jackson, F. H. Ward, Esq. 9, *Albion-street, Hyde-park, W.*
1871	Jackson, Henry, Esq., Lieut. late I.N. (Chief Surveyor of the Province of Wellington). *New Zealand.*
1871	Jackson, Richd. Belgrave, Esq. 16, *Addison-terrace, Kensington, W.*
1866	Jackson, Robert Ward, Esq. 28, *Inverness-road, Hyde-park, W.*

Year of Election	
1871	Jackson, Thos. Hughes, Esq. *Manor-house, Birkenhead.*
1855	Jackson, William, Esq. 44, *Portland-place, W.*
1871	Jackson, Wm. Chas., Esq. *Universities Club,* 71, *Jermyn-street, S.W.*
1862	Jacomb, Thomas, jun., Esq. 23, *Old Broad-street, Gresham-house, E.C.*
1861	1310James, William Bosville, Esq. 13, *Blomfield-road, Maida-hill, W.*
1870	James, William Morris, Esq. 8, *Lyndhurst-road, Hampstead, N.W.*
1868	Jamieson, Hugh, Esq. *Junior Carlton Club, S.W.*
1868	Jamieson, Robert Alexander, Esq., M.A. *Shanghai. Care of J. P. Watson, Esq., St. Dunstan's-buildings, St. Dunstan's-hill, E.C.*
1862	*Jaques, Leonard, Esq. *Wentbridge-house, Pontefract, Yorkshire.*
1863	*Jardine, Andrew, Esq. *Lanrick-castle, Stirling.*
1863	*Jardine, Robert, Esq. *Castlemilk, Lockerby, N.B.*
1871	Jarrad, Lieut. F. W., R.N. *H.M.S. 'Porcupine,' and Avon-house, Langley-Burrel, near Chippenham.*
1857	Jefferson, Richard, Esq. *A 4, The Albany, W.*
1872	Jeffreys, A. F., Esq. *Fernhill, Bournemouth; and* 21, *Sackville-street, W.*
1865	1320Jeffreys, J. G., Esq., F.R.S. *Ware-priory, Herts.*
1860	*Jejeebhoy, Sir Jamsetjee, Bart. *Bombay.*
1854	Jellicoe, Charles, Esq. 12, *Cavendish-place, W.*
1854	Jenkins, Capt. Griffith, I.N., C.B. *East India Club, St. James's-square, S.W.; and Derwen, Welshpool, Montgomeryshire.*
1837	*Jenkins, R. Castle, Esq. *Beachley, near Chepstow.*
1854	*Jennings, William, Esq., M.A. 13, *Victoria-street, Westminster, S.W.*
1871	Jenoure, Alfred, Esq. *Kew, Surrey.*
1860	Jermyn, Rowland Formby, Esq. *War-office, S.W.*
1873	Jervis, Theodore, Esq. 80, *Thistle-grove, W.*
1870	Jessop, Captain Thomas. 37, *Clarges-street, Piccadilly, W.*
1860	1330Jessopp, Rev. Augustus, M.A., Head Master, King Edward VI. School. *Norwich.*
1864	*Jeula, Henry, Esq. *Lloyd's, E.C.*
1873	Jocelyn, Hon. W. Nassau, Secretary of Legation. *Stockholm.*
1859	*Johnson, Henry, Esq. *Messrs. Johnson,* 7, *Bedford-row; and Worthing, Sussex.*
1854	Johnson, John Hugh, Esq.
1866	Johnson, W. H., Esq., Civil Assistant G. T. S. India. *Care of F. Drew, Esq., Claremont-road, Surbiton.*
1868	*Johnston, Alexander Keith, Esq., jun. *Care of Mr. Turner.*
1856	Johnston, A. R., Esq., F.R.S. *Heatherley, Sandhurst, near Wokingham, Berks.*
1857	Johnston, J. Brookes, Esq. 29, *Lombard-street, E.C.*
1871	Johnston, T. B., Esq., F.R.S.E. 4, *St. Andrew-square, Edinburgh.*
1868	1340Johnston, Thomas, Esq. 12, *Belvedere, Bath; and King Edward VI. Grammar-school, Bath.*
1866	Johnstone, Colonel H. C., C.B., F.R.A.S. *Murree, Punjaub, India. Care of Messrs. H. S. King and Co., Cornhill, E.C.*
1867	*Johnstone, John, Esq. *Castelman-house, Mortlake, S.W.*

Year of Election.	
1873	Johnstone, W. Woods, Esq., M.D. 44, *Princess-square, W.*
1872	Jolley, Wm. Rowe, Esq., M.A., Hon. Chaplain to the Queen.
1864	Jones, Captain Felix, late I.N. *Fernside, Church-road, Westow-hill, Upper Norwood, S.*
1868	Jones, Captain H. M., V.C.
1857	Jones, Lieut.-Col. Jenkin, Royal Engineers. 1, *Lennard-place, Circus-road, St. John's-wood, N.W.; and India.*
1862	Jones, John, Esq. 338, *Strand, W.C.*
1873	Jones, Rev. John. 1, *Crowland-terrace, Church-road, Islington, N.*
1872	1350 Jones, Staff-Commander Jno., R.N. 6, *Edwardes-square, Kensington, W.*
1871	Jones, Robert, Esq. *The Manor-house, St. John's-wood-park, N.W.*
1861	Jones, Sir Willoughby, Bart. *Cranmer-hall, Fakenham, Norfolk.*
1873	Jones, Winslow, Esq. *Heavitree, near Exeter.*
1867	*Jordan, Wm. Leighton, Esq. 1, *Powis-square, Notting-hill, W.*
1863	Joshua, Moss, Esq. *Melbourne.*
1873	Kane, Dr. William. *Dinan, Cotes du Nord, France.*
1868	Kantzow, Captain H. P. de, R.N. *United Service Club, S.W.*
1858	Kay, David, Esq. 19, *Upper Phillimore-place, Kensington, W.*
1865	Kaye, Sir John W., K.C.S.I., F.R.S. *India-office, S.W.*
1857	1360 Keating, Hon. Sir Henry Singer. 11, *Prince's-gardens, S.W.*
1873	*Keightley, Alfred D., Esq. *Milnthorpe, Penrith, Westmoreland.*
1863	Keir, Simon, Esq. *Conservative Club, S.W.*
1845	*Kellett, Rear-Admiral Sir Henry, K.C.B. *Clonmel, Ireland.*
1860	*Kemball, Col. Sir Arnold Burrowes, K.C.S.I., C.B., Indian Army. *United Service Club, S.W.*
1871	Kemp, Geo. L., Esq., Manager of the Standard Insurance Co. (of England) Calcutta. *Care of Messrs. A. W. Ray and Co.*, 10, *Old Jewry Chambers, E.C.*
1873	Kemp, Rev. Henry William, B.A. *The Charter-house, Hull.*
1863	Kempster, J., Esq. 1, *Portsmouth-place, Kennington-lane, Surrey, S.*
1861	Kennard, Adam Steinmetz, Esq. 7, *Fenchurch-street, E.C.*
1871	Kennedy, Henry Hyndham, Esq. 5, *Clarendon-place, Hyde-park-gardens, W.*
1874	1370 Kennedy, John, Esq., M.D. *East India United Service Club*, 14, *St. James's-square.*
1854	Kennedy, Rev. John, M.A. 4, *Stepney-green, E.*
1871	Kennion, Rev. George Wyndham, B.A. *St. Paul's-vicarage, Hull.*
1871	Kenrick, George, Esq. 6, *Percy-villas, Campden-hill, Kensington, W.*
1872	Kerr, Alexander, Esq. (Banker), Wellington, New Zealand. *Care of Norman S. Kerr, Esq.*, M.D., *Markgate-street, near Dunstable, Bedfordshire.*

Year of Election.	
1863	Kerr, Staff-Commr. J. H., R.N. *Hydrographic-office, S.W.*
1862	Kershaw, Wm., Esq. 16, *St. Mary Axe, E.C.; and Suffolk-lodge, Brixton-road, S.*
1857	Keysell, Francis P., Esq. *Grove-house, Cheshunt.*
1864	*Kiddle, W. W., Esq. *Linton-villa, Clarendon-road, Southsea.*
1864	Kimber, Dr. E. *Murchison-house, Dulwich, S.E.*
1846	1380King, Lieut.-Colonel Edward R., 36th Regt. *Junior United Service Club, S.W.*
1870	King, Henry S., Esq. J.P. 65, *Cornhill, E.C.; 45, Pall-mall, S.W.; Manor-house, Chigwell, Essex; and Junior Carlton Club, S.W.*
1872	King, James, Esq. 12, *Claremont-terrace, Glasgow.*
1866	King, John, Esq. *Compton-field-place, Guildford, Surrey.*
1861	King, Lieut.-Col. W. Ross, Unatt., F.S.A. Scot. *Tertowie, Kinellar, Aberdeenshire; and Army and Navy Club, S.W.*
1873	*Kingsley, Maurice, Esq. 2 *Woodside, Harrow-on-the-hill.*
1857	*Kinnaird, Hon. Arthur F., M.P. 2, *Pall-mall-east, S.W.*
1867	Kinnaird, George William Fox, Lord, K.G. *Rossie-priory, Inchture, N.B.; and 33, Grosvenor-street, W.*
1858	Kirk, John, Esq., M.D. *Care of J. F. Rogers, Esq., 25, South-castle-street, Edinburgh.*
1863	Kirke, John, Esq., Barrister. *C. Thorold, Esq., Welham, Retford, Notts.*
1870	1390Kirkland, Major-Gen. John A. Vesey. 17, *Whitehall-place, S.W.*
1868	Kisch, Daniel Montagu, Esq. 47, *Gloucester-square, Hyde-park, W.*
1866	*Kitson, James, jun., Esq. *Spring-bank, Headingley, Leeds.*
1868	Kitto, Richard L. Middleton, Esq. *Church-hill-villa, Fryerstown, Victoria, Australia.*
1835	*Kjaer, Thomas Andreas, Esq. *Gathersgaden* No. 26, *Copenhagen.*
1867	Knight, Andrew Halley, Esq. *Care of R. Philpott, Esq., 3, Abchurch-lane, E.C.*
1862	Knollys, General Sir William T., K.C.B. *Eaton-square, S.W.*
1871	Knollys, Major W. W. (93rd Highlanders). 102, *Belgrave-road, S.W.*
1874	Knowles, George, Esq., C.E. 11, *Queen's-gardens, Hyde-park, W.*
1867	Knox, Alex. A., Esq. 91, *Victoria-street, Westminster, S.W.*
1861	1400Knox, Thomas G., Esq. *India. Care of Messrs. H. S. King and Co., 45, Pall-mall, S.W.*
1866	Kopsch, Henry, Esq. *Custom-house, Shanghai. Care of H. C. Batchelor, Esq., 155, Cannon-street, E.C.*
1861	Kyd, Hayes, Esq., M.R.C.S. *Wadebridge, Cornwall.*
1859	Labrow, Lieut.-Colonel Valentine H., F.S.A., F.G.S. *Mitre-court-chambers, Temple, E.C.; and Club-chambers, S.W.*
1870	Lackersteen, Mark H., Esq., M.D., &c. 29, *Queen Anne-st., Cavendish-sq., W.*
1849	*Laffan, Colonel Robert Michael, R.E. *Army and Navy Club, S.W.*
1870	Laing, Arthur, Esq. 18, *Kensington-gardens-square, Hyde-park, W.*
1869	Lamb, Hon. Edward William. *Brisbane, Queensland, Australia.*

Year of Election.	
1859	Lamb, Lieut. Henry, I.N. *H.M. India Store Department, Belvedere-road, Lambeth, S.*
1863	*Lambert, Alan, Esq. *Heath-lodge, Putney-heath, S.W.*
1864	1410Lambert, Charles, Esq. 2, *Queen-street-place, Upper Thames-street, E.C.*
1867	Lambert, Wm. Blake, Esq., C.E. 3, *Morden-road, Blackheath, S.E.*
1861	Lamont, James, Esq. *Gartmore-house, Stirling.*
1870	Lamplough, Charles Edward, Esq. *City of London Club, E.C.*
1866	Lampray, John, Esq. 16, *Camden-square, N.W.*
1867	Lamprey, Jones, Esq., M.B., Surgeon-Major 67th Regiment.
1864	Lampson, Sir C. M., Bart. 80, *Eaton-square, S.W.*
1838	*Lance, John Henry, Esq., F.L.S. *The Holmwood, Dorking.*
1861	*Lang, Andrew, Esq. *Dunmore, Hunter-river, New South Wales; and Dunmore, Teignmouth, Devon.*
1859	*Lange, Sir Daniel A. 21, *Regent-street, W.*
1856	1420*Langler, John R., Esq., B.A. *Wesleyan Training College, Westminster; and Gothic-villas, 2, Bridge-road-west, Battersea, S.W.*
1865	Langley, Edward, Esq. *Well-hall, Eltham, Kent.*
1871	Langworthy, Edward, Esq. *Gap-house, Holyport, Maidenhead.*
1870	Lanyon, Charles, Esq. 3, *Paper-buildings, Temple, E.C.*
1833	*Larcom, Major-General Sir Thomas Aiskew, Bart., R.E., K.C.B., F.R.S. *Heathfield, Fareham, Hants.*
1872	Larcom, Lieut. T. H. *Care of Messrs. Stilwell, 22, Arundel-street, W.C.*
1861	Lardner, Colonel John. *United Service Club, S.W.*
1873	Large, Robert Emmott, Esq. *Vernon-lodge, Teddington; and 13, South-square, Lincoln's-inn, W.C.*
1859	Larnach, Donald, Esq. 21, *Kensington-palace-gardens, W.*
1870	Lasseter, Frederic, Esq. *The Grove, Hanwell, W.*
1854	1430Latrobe, Ch. J., Esq. *Clapham-house, Lewes, Sussex.*
1870	Laughton, Lieut.-Col. George Arnold (Bombay Staff Corps). *Superintendent Bombay Survey, Bombay.*
1869	Laughton, J. K., Esq. *Royal Naval College, Greenwich.*
1873	Law, Geo., Esq. 1, *Raymond-buildings, Gray's-inn, W.C.*
1846	*Law, Hon. H. Spencer, M.A. 40, *Eaton-place, S.W.*
1873	Law, Jas., Esq. 22, *Gower-street, W.*
1870	Lawrence, Alexander, Esq. *Clyde-house, Thurlow-road, Hampstead; and Windsor-chambers, Great St. Helen's, E.C.*
1874	Lawrence, Fred. W. Esq. *Oakleigh, Beckenham, Kent.*
1870	Lawrence, Lord, G.C.B., G.C.S.I. 26, *Queen's-gate, W.*
1870	*Lawrence, Philip Henry, Esq. 12, *Whitehall-place, S.W.*
1873	1440Lawrence, W. F., Esq. *New University Club, W.*
1873	Lawrence, W. L., Esq. *Sevenhampton-manor, Andoversford, Gloucester.*
1868	Lawrie, James, Esq. 63, *Old Broad-street, E.C.*
1867	Lawson, William, Esq. 21, *Walham-grove, Fulham, S.W.*
1862	*Lay, Horatio N., Esq.

Year of Election.	
1857	Layard, Right Hon. Austen H., D.C.L. 130, *Piccadilly, W.*
1866	*Layard, Captain Brownlow Villiers (3rd W. India Regt.). *Junior United Service Club; and* 38, *Upper Mount-street, Dublin.*
1863	*Leaf, Charles J., Esq. *Old-change, E.C.; and The Rylands, Norwood, S.*
1869	*Leaf, F. H., Esq. *Burlington-lodge, Streatham-common, S.W.*
1874	Learmonth, Andrew James L., Esq. 72, *Brook-street, W.*
1873	1450Leaver, J. Cristopher, Esq., *Rostherne-house, Castlenau, Barnes, Surrey.*
1866	Lebour, G. A., Esq. 28, *Jermyn-street, S.W.*
1853	*Le Breton, Francis, Esq. 21, *Sussex-place, Regent's-park, N.W.*
1861	Leckie, Patrick C., Esq. 7, *Palace-road, Roupell-park, Streatham, S.*
1870	Lecky, Squire Thornton Stratford, Esq., Lieut. Royal Naval Reserve. 4, *St. Domingo-grove, Buckfield-road, Liverpool, N.*
1868	Lee, John, Esq. *Grosvenor-cottage, Loughborough-road, S.W.*
1873	Lee, John Dunkin, Esq. *Northwood-park, Cowes, Isle of Wight.*
1869	*Lees, Lieutenant-Colonel Nassau, D.C.L. *Athenæum Club, S.W.*
1865	Le Feuvre, W. H., Esq., C.E. 68, *Bedford-gardens, Kensington, W.*
1833	*Lefevre, Sir John George Shaw, M.A., D.C.L., F.R.S., Vice-Chancellor of the University of London. 18, *Spring-gardens, S.W.*
1853	1460Lefroy, General John Henry, R.A., F.R.S. *Athenæum Club, S.W.*
1862	Leggatt, Clement Davidson, Esq. 43, *Inverness-terrace, W.*
1861	Legh, Wm. John, Esq. 38, *Belgrave-square, S.W.; and Lyme-park, Cheshire.*
1861	*Lehmann, Frederick, Esq. 15, *Berkeley-square, W.*
1845	Leigh, John Studdy, Esq., F.G.S. 6, *Talbot-road, Westbourne-park, W.*
1869	Leigh, Roger, Esq. *Barham-court; and Hindley-hall, Hindley.*
1863	Le Mesurier, Henry P., Esq., C.E. 21, *Stanley-crescent, Kensington-park, W.*
1856	Leslie, The Hon. G. W. 4, *Harley-street, W.*
1873	Leslie, William, Esq. *Warthill, Aberdeenshire, N.B.; and Carlton Club, Pall-mall, S.W.*
1867	L'Estrange, Carleton, Esq. *Carlton Club, S.W.*
1873	1470Letts, Thomas, Esq. 2, *Crown-buildings, Queen Victoria-street, E.C.*
1857	Leverson, George B. C., Esq. 18, *Queensberry-place, Cromwell-road, S.W.*
1869	Leveson, Edward J., Esq. *Cluny, Crescent-wood-road, Sydenham-hill, S.E.*
1873	Levi, Professor Leone, F.S.A., &c., Doc. Pol. Econ. Univ. Tub., Con. Gen. for Paraguay. 19, *Richmond-crescent, Barnsbury, N.; and Furrar's Buildings, Temple, E.C.*
1866	Levinge-Swift, Richard, Esq.
1859	Levinsohn, Louis, Esq. *Vernon-house, Clarendon-gardens, Maida-hill, W.*
1873	*Lewin, Frederick Dealtry, Esq. *Morelands, St. John's-park, Blackheath, S.E.*
1869	*Lewin, Capt. Thomas (Beng. Staff Corps). *East India United Service Club, S.W.*
1872	Lewis, Jos., Esq., R.A. *Castle Carrow, Carrick-on-Shannon.*
1852	Leycester, Captain Edmund M., R.N. 17, *Eastbourne-terrace, Paddington, W.*
1859	1480Lichfield, Thomas George, Earl of. *Shugborough, Staffordshire.*
1872	Liebenrood, Captain J., R.N. *Belmont-lodge, Lee, Kent; and* 35, *Moray-place, Edinburgh.*

Year of Election.	
1869	Ligar, C. W., Esq., Surveyor-General of Victoria. 4, *Royal Exchange-avenue, E.C.; and Melbourne, Australia.*
1870	Light, Rev. John. 13, *Notting-hill-terrace, W.*
1856	Lilford, Thomas Lyttleton Powys, Lord. 10, *Grosvenor-place, W.*
1860	Lindsay, H. Hamilton, Esq. *Windham-place, Bryanston-square.*
1857	Lindsay, Major-General the Hon. J., Grenadier Guards, M.P. 20, *Portman-sq., W.*
1870	Lindsay, Lord., M.P. 47, *Brook-street, Grosvenor-square, W.*
1867	*Lindsay, Colonel Robert J. L., M.P., V.C. *Lockinge-house, Wantage, Berks; and 2, Carlton-gardens, S.W.*
1855	*Lindsay, William S., Esq. *Manor-house, Shepperton, Middlesex.*
1869	1490Lindsey, Mark John, Esq. 32, *Ludgate-hill, E.C.; and Burnt-ash-lane, Lee, Kent.*
1868	Linton, Robert P., Esq., F.R.C.S., M.R.I. 14, *St. James's-square, S.W.*
1866	Little, Archibald J., Esq. *Shanghai;* 18, *Park-street, Grosvenor-square, W.*
1871	Little, Simon, Esq. *Calantra-house, Wexford, Ireland.*
1870	Littleton, The Hon. Henry S. *Teddesley, Penkridge, Staffordshire.*
1874	Lloyd, Francis Aylmer, Esq. 22, *Queen's-terrace, Finchley-road, N.W.*
1857	*Lloyd, Hon. George A. *Sydney, N.S.W.; George-yard, Lombard-street, E.C.*
1873	Lloyd, Percival, Esq. *The Limes, Crouch-hill, Hornsey.*
1863	Lloyd, Sir Thomas Davis, Bart. *United University Club, S.W.; and Bronwydd, Carmarthen.*
1864	*Lloyd, W., Esq. *Myood-house, Wednesbury, Staffordshire.*
1867	1500Lloyd, Rev. William V., M.A.
1861	Lluellyn, Capt. Richard. 20, *Montagu-square, W.*
1869	Lluellyn, Major William R., R.A. *Dover Castle, Dover.*
1868	Lobley, James Logan, Esq., F.G.S. 59, *Clarendon-road, W.*
1872	Lobo, Manoel da Gama, Esq., M.D. *Rio de Janeiro.*
1863	Loch, George, Esq.
1859	Loch, Henry Brougham, Esq. *Government-house, Isle of Man.*
1861	Loch, John Charles, Esq. *Hong-Kong.*
1857	Loch, William Adam, Esq. 8, *Great George-street, Westminster, S.W.*
1864	Locke, John, Esq. 83, *Addison-road, Kensington, W.*
1858	1510Lockhart, William, Esq., F.R.C.S. *Park-villas, Granville-park, Blackheath, S.E.; and China.*
1868	Lockhart, Captain Wm. Stephen Alexander.
1860	Lockwood, James Alfred. *United Arts Club, Hanover-square, W.*
1872	Logan, Sir T. Galbraith, K.C.B., M.D. 40, *Hyde-park-square, W.*
1856	*Logan, Sir William Edmond, F.R.S. *Montreal, Canada.*
1868	Lomonossoff, M. Alexis de. *Irkoutsk, East Siberia.*
1860	Londesborough, Wm. Henry Forester, Lord. 38, *Berkeley-square, W.*
1830	*Long, George, Esq., M.A. 2, *Rhine-villas, Portfield, Chichester.*
1857	*Long, W. Beeston, Esq.
1872	Longden, J. R., Esq. *Government-house, Trinidad. Care of Mr. A. Walker, 13, King's-road, Bedford-row, W.C.*
1865	1520*Longley, Major George, R.E. 60, *Prince's-gate, W.*

Year of Election.	
1847	Longman, Thos., Esq. *Paternoster-row, E.C.*
1858	Longman, William, Esq. 36, *Hyde-park-square, W.*
1870	*Longstaff, Capt. Llewellyn Wood. *Ganstead-hall, Hull.*
1861	Lonsdale, Arthur Pemberton, Esq.
1860	Looker, William Robert, Esq. *Melbourne, Australia. Care of Mr. Ashhurst,* 16, *Bishopsgate-street-within, E.C.*
1864	Lothian, William Schomberg, Marquis of. 15, *Bruton-street, W.*
1873	Lovell, Thomas, Esq., M.I.C.E. *Lucknow, India.*
1873	Lovett, Capt. Beresford, R.E., *East India United Service Club,* 14, *St. James's-square, S.W.*
1856	Lovett, Phillips Cosby, Esq. *Liscombe-house, Liscombe, Leighton Buzzard, Bucks.*
1867	1530Low, Alex. F., Esq. 84, *Westbourne-terrace, W.*
1863	Low, S. P., Esq. 55, *Parliament-street, S.W.*
1858	Lowden, Rev. George Rouse. *St. Leonard-villa, Hanwell, Middlesex.*
1859	Lowe, Captain W. Drury. *Myria, Bettws-y-Coed, Llanrwst, North Wales.*
1830	Lowry, Joseph Wilson, Esq. 39, *Robert-street, Hampstead-road, N.W.*
1873	*Lowther, Capt. Marcus, R.N. *Thornton, Ryde.*
1860	Loyd, Colonel W. K. *Union Club, S.W.*
1870	Luard, Captain Charles Edward, R.E. *War-office, Whitehall.*
1866	Luard, Wm. Charles, Esq. *Llandaff-house, Cardiff; and Athenæum Club, S.W.*
1871	*Lubbock, Sir John, Bart, M.P., F.R.S., &c. *High-elms, Beckenham, Kent.*
1871	1540Ludlow, Edgar John David, Esq. *Care of Geo. Perry, Esq.,* 67, *Charlewood-street, St. George's-road, S.W.*
1873	Lugard, General Right Hon. Sir Edward, G.C.B. *E 3, Albany, W.*
1872	*Lumsden, Colonel P. S., C.S.I., Quartermaster-General, Bengal Army. *Care of General H. Lumsden.*
1860	Lush, Sir Robert, Q.C. *Balmoral-house, Avenue-road, Regent's-park, N.W.*
1873	*Lushington-Tilson, Rev. W. R. Tilson Marsh, M.A. *Oxford and Cambridge Club, S.W.; Conservative Club, W.; and Stretham Manor, Isle of Ely.*
1870	Lyall, George, Esq. 73, *Eaton-place, S.W.; and Hedley, near Epsom.*
1873	Lycett, Sir Francis, K.C.B. 18, *Highbury-grove, Highbury, N.*
1866	Lydall, J. H., Esq. 12, *Southampton-buildings, Chancery-lane, W.C.*
1873	Lydgate, Robert, Esq. *Castle Guildford School, Guildford.*
1873	Lydgate, Wm., Esq.
1869	1550Lye, John Gaunt, Esq. 18, *Prince of Wales-terrace, Kensington, W.*
1830	*Lyell, Sir Charles, Bart., M.A., LL.D., F.R.S. 73, *Harley-st., Cavendish-sq., W.*
1861	*Lynch, Thomas Kerr, Esq. 31, *Cleveland-square, Hyde-park, W.*
1858	Lyne, Francis, Esq. 12, *Blomfield-terrace, Harrow-road, W.*

Year of Election.	
1873	Macaulay, William, Esq. 122, *Leadenhall-street, E.C.*
1863	Macbraire, James, Esq. *Broadmeadows, Berwick-on-Tweed.*
1862	Macdonald, Chessborough C., Esq. 32, *Belsize-park, Hampstead, N.W.*
1871	Macdonald, William, Esq. *Yokohama, Japan.*
1843	Macdonnell, Sir Richard Graves, K.C.M.G., C.B. 58, *Curzon-street, Mayfair, W.*
1873	MacEachen, Archibald, Esq. 56, *Brunswick-street, Glasgow.*
1865	1560Macfarlan, John G., Esq. *The Tower, Richmond-bridge.*
1874	Macfarlane, Donald H., Esq. 62, *Portland-place, W.*
1868	MacGregor, Lieut.-Col. C. M. *Bengal. Care of Messrs. H. S. King and Co.,* 65, *Cornhill, E.C.*
1855	MacGregor, Duncan, Esq. *Athenæum Club, S.W.*
1872	*MacGregor, John, Esq., M.A. *Athenæum Club, S.W.*
1845	*Macintyre, Patrick, Esq., F.S.A., Off. Assoc. Inst. Act. 1, *Maida-vale, W.*
1868	Mackay, Dr. A. E., R.N. *Admiralty, Somerset-house, W.C.*
1859	Mackay, Rev. Alexander, LL.D. 1, *Hatton-place, Grange, Edinburgh.*
1870	Mackay, Nevile F., Esq. 2, *Elm-court, Temple, E.C.*
1859	*Mackean, Thomas W. L., Esq. *Bank of British Columbia,* 5, *East India-avenue, E.C.*
1873	1570Mackelvie, Jas. Tannock, Esq. *Care of Messrs. Sinclair, Hamilton, and Co.,* 17, *St. Leonard's-place, E.C., and* 7, *Albemarle-street, W.*
1845	Mackenzie, Right Hon. Holt, F.R.A.S. *Athenæum Club, S.W.; and* 28, *Wimpole-street, W.*
1872	Mackenzie, J. J., Esq. *Sidney-lodge, Wimbledon-common.*
1860	*Mackenzie, James T., Esq.
1863	Mackenzie, John H., Esq. *Wallington, Carshalton, Surrey.*
1873	Mackenzie, William, Esq., M.D.C.B. 3, *Talbot-square, Hyde-park, W.; and East India United Service Club, S.W.*
1864	*Mackeson, Edward, Esq. 13, *Hyde-park-square, W.*
1862	Mackinlay, D., Esq. *Oriental Club, W.*
1867	Mackinlay, John, Esq., J.P., M.I.C.E., Chief Engineer and Inspector of Machinery, H.M. Dockyard, and Surveyor to the Port, Bombay. *Care of Charles Bannerman, Esq.,* 193, *Camberwell-new-road, Kennington, S.*
1864	Mackinnon, C. D., Esq. *Care of Messrs. J. Clinch and Sons,* 31, *Abchurch-lane, E.C.*
1855	1580*Mackinnon, Wm. Alex., Esq., M.P., F.R.S. 4, *Hyde-park-place, W.*
1865	*Mackinnon, W., Esq. *Balinakiel-by-Harbert, Argyleshire.*
1872	Mackintosh, Alex, Esq. 9, *Talbot-square, Hyde-Park, W.*
1861	Mackintosh, Alexander Brodie, Esq. *Oriental Club, W.; and Dunoon, Scotland.*
1860	Mackirdy, Major-Gen. Elliot, 69th Regiment. *U.S. Club, S.W.*
1873	Mackley, Thomas Cole, Esq. *Ferndale, Streatham.*
1871	Maclagan, Colonel Robert, R.E. *Care of Messrs. Crawford, Colvin, and Co.,* 71, *Old Broad-street, E.C.*
1871	Maclaine, Murdoch G., Esq. 6, *Princes-square, Bayswater, W.*
1860	Maclean, William Crighton, Esq., F.G.S. 31, *Camperdown-pl., Great Yarmouth.*
1859	MacLeay, George, Esq. *Pendell-court, Bletchingley.*

Year of Election.	
1870	1590MacLeod, Lieut. Angus, R.N. *H.M.S. "Excellent," Portsmouth.*
1874	Macliver, David, Esq. 24, *Mall, Clifton, Bristol.*
1871	*McClure, Joseph Henry, Esq. 2, *Woodland-terrace, Higher Broughton, Manchester.*
1855	Maclure, Andrew, Esq. *Maclure, Macdonald, and Macgregor*, 37, *Walbrook, E.C*
1861	Maclure, John William, Esq. *Fallowfield, near Manchester.*
1861	Macmillan, Alex., Esq. 16, *Bedford-street, Covent-garden, W.C.*
1874	MacMurdo, Major-General, C.B. *Rose-bank, Fulham.*
1871	Macnab, Duncan Macpherson, Esq. *Union Club, S.W.*
1855	Macnab, John, Esq. *Findlater-lodge, Trinity, near Edinburgh.*
1868	Macnair, George, Esq. *Oriental Club, Hanover-square, W.*
1871	1600Macpherson, Daniel, Esq. *Cadiz; and* 1, *King-street, St. James's, S.W.*
1871	Macpherson, Hugh Martin, Esq. *E. I. United Service Club, S.W.*
1861	Macpherson, William, Esq. *Rustic-house, Putney.*
1870	Macturk, John, Esq. *Tillicoultry.*
1871	MacVicar, Lt. Jno. A., 93rd Highlanders. *North Camp, Aldershot.*
1873	McAlpin, Donald A. L., Esq., R.N. *H.M.S. 'Favourite,' Queensferry, N.B.*
1873	McAlpin, Kenneth W. A. G., Esq. *Warsaw-villa, Aldershot.*
1863	McArthur, Alex., Esq. *Raleigh-hall, Brixton-rise, Brixton, S.*
1867	McArthur, William, Esq. 1, *Guyder-houses, Brixton-rise, S.*
1860	McClintock, Admiral Sir Francis Leopold, F.R.S. *United Service Club, S.W.; and H.M. Dockyard, Portsmouth.*
1861	1610*McConnell, W. R., Esq., Barrister-at-Law. 12, *King's-Bench-walk, Temple, E.C.; and Charleville, Belfast.*
1862	McCosh, John, Esq., M.D. *Junior United Service Club, S.W.*
1866	McNair, Major John F. A., R.A.
1865	McDonald, James, Esq. *Oriental Club, Hanover-square, W.*
1865	McEuen, D. P., Esq. 24, *Pembridge-square, Bayswater, W.*
1867	McGregor, Duncan, Esq. *Clyde-place, Glasgow.*
1869	McGrigor, Alexander Bennett, Esq. 19, *Woodside-terrace, Glasgow.*
1866	*McIvor, W. G., Esq., *Sup. of Chinchona Plantations, Ootacamund, Madras. Care of Mr. E. Bumpus, Holborn-bars, E.C.*
1858	McKerrell, Robert, Esq. 45, *Inverness-terrace, W.; and Mauritius.*
1873	McKerlie, P. H., Esq. 26, *Pemendge-villas, Bayswater, W.*
1868	1620M'Clean, Frank, Esq., M.A., C.E. *Ferncliffe, Tunbridge-wells.*
1867	*McLean, Hon. John. *Oamaru, New Zealand. Care of Messrs. Redfern, Alexander, and Co.*, 3, *Great Winchester-street-buildings, E.C.*
1870	McLeod, Major-Gen. W. C. 14, *St. James's-square, S.W.*
1852	M'Leod, Walter, Esq. *Head Master of the Royal Military Asylum, Chelsea, S.W.*
1874	McMahon, Colonel A. 46, *Ebury-street, W.*
1839	M'Neil, The Right Hon. Sir John, G.C.B. *Granton, near Edinburgh.*
1873	McVean, Colin A., Esq. Surveyor General of Japan. *Care of Rev. D. McVean, Brunessan, Scotland.*
1872	Magrath, Colonel John R., Madras Artillery, Ret. *Percy-house, Horn-park, Lee, S.E.; and East India U. S. Club*, 14, *St. James's-square.*

Year of Election.	
1871	Major, Henry, Esq., B.A. *Sherwood-house, Mansfield-road, Nottingham.*
1845	*Major, Richard Henry, Esq., F.S.A. *Athenæum Club, S.W.; and British Museum, W.C.*
1868	1630*Makins, Henry F., Esq. 19, *Prince of Wales-terrace, Kensington-palace, W.; and Reform Club, S.W.*
1858	Malby, John Walter, Esq. 15, *Richmond-villas, Seven-sisters'-rd., Holloway, N.*
1853	*Malby, Thomas, Esq. 2, *Park-villas, Seven-sisters'-road, Holloway, N.*
1862	*Malcolm, Major Edward Donald, R.E. ⚓ *Chatham.*
1863	Malcolm, James, Esq. 22, *Prince's-gate, Knightsbridge, W.*
1843	*Malcolm, W. E., Esq. *Burnfoot, Langholme, near Carlisle.*
1873	Malleson, Colonel G. B. *Care of Coutts and Co., Strand, W.C.*
1853	*Mallet, Chas., Esq. *Audit-office, W.C.; and 7, Queensbro'-terrace, Bayswater, W.*
1870	Man, Captain J. Alexander (Commissioner of Customs for Formosa, &c.) *Care of P. J. King, Esq.*, 10, *St. Stephen's-square, Bayswater, W.*
1872	Man, Captain William. *Care of B. F. Stevens*, 17, *Henrietta-street, Covent-garden, W.C.*
1872	1640Man, William, Esq. *Woodford, Essex.*
1860	Mann, James Alexander, Esq., M.R.A.S. *Enfield-villa, Enfield.*
1866	Mann, Robert James, Esq., M.D. 5, *Kingsdown-villas, Wandsworth-common, S.W.*
1866	Manners, George, Esq., F.S.A. *Lansdowne-road, Croydon.*
1868	Manners-Sutton, Graham, Esq., 7, *Gloucester-terrace, Hyde-park, W.*
1874	Manners-Sutton, Hon. Robert Henry. *Brooke, Norfolk; and* 21, *Cambridge-terrace, Hyde-park, W.*
1856	Manning, Frederick, Esq. *Byron-lodge, Leamington; and* 8, *Dover-street, W.*
1864	*Mansell, Captain A. L. *Hydrographic-office, Admiralty, S.W.*
1869	Mantell, Sir John Iles. *Swinton-park, Manchester; and Windham Club, S.W.*
1859	Mantell, Walter Baldock Durant, Esq. *Wellington, New Zealand. Care of J. G. Cooke, Esq.*, 25, *Austin-friars, E.C.*
1873	1650Mantle, Wm. John, Esq., *Northgate, Lincoln.*
1869	March, Edward Bernard, Esq., H.M. Consul, Fiji Islands. *Care of Messrs. F. O'Brien and Co.*, 43, *Parliament-street, S.W.*
1873	Margary, Aug. R. Esq. *China.*
1871	Margetts, William G., Esq. *Allamira, Stonebridge, Willesden, N.W.*
1872	Margoschis, John Thomas, Esq. *Trichinopoly, South India. Care of Arthur Margoschis, Esq., St. Augustine's College, Canterbury.*
1860	Mariette, Prof. Alphonse, M.A. 27, *St. Stephen's-square, Bayswater, W.*
1873	Markham, Captain Albert Hastings, R.N. 21, *Eccleston-square, S.W.*
1854	Markham, Clements Robert, Esq., C.B., F.R.S. *India-office, S.W.; 21, Eccleston-square, S.W.; and Athenæum Club, S.W.*
1864	Marsden, Rev. Canon. *Higher Broughton, Manchester.*
1857	Marsh, Matthew Henry, Esq. *Oxford and Cambridge Club, S.W.*
1873	1660Marshall, Charles H., Esq. 29, *York-terrace.*
1862	*Marshall, J. G. Don, Esq. 15, *Brock-street, Bath.*

Year of Election.	
1873	Marshall, John, Esq. *Auckland-lodge, Queen's-road, Richmond, S. W.*
1862	Marshall, William, Esq. 71, *Mornington-road, W.*
1859	*Marsham, The Hon. Robert. 5, *Chesterfield-street, Mayfair, W.*
1857	Marshman, J. C., Esq. 7, *Kensington-palace-gardens, W.*
1874	Marten, C. Rous, Esq. *Wellington, New Zealand.*
1871	Marten, Elliott, Esq., Vice-Consul, Sarawak. *Care of W. T. Marten, Esq.,* 30, *Great St. Helen's, E.C.*
1857	Martin, Francis P. B., Esq.
1861	Martin, Henry, Esq. *Sussex-house, Highbury-new-park, N.*
1860	1670*Martin, Richard Biddulph, Esq. *Clarewood, Bickley, S.E.*
1862	Martin, Thomas, Esq. 5, *Compton-terrace, N.*
1870	Martin, Wm. Coleman, Esq. *Shireoaks, Worksop, Notts.*
1870	*Martindale, William, Esq. 66, *Upper Thames-street, E.C.; Gresham Club, E.C.; and Gainsborough-lodge, Leytonstone, Essex.*
1871	Mason, Charles, A. J., Esq. 3, *Gloucester-crescent, Hyde-park, W,*
1871	Master, Chas. Hoskins, Esq. *Barrow-green-house, Oxted, near Godstone, Surrey.*
1870	Masterman, Edward, Esq. 30, *Threadneedle-street, E.C.; and* 27, *Clement's-lane, Lombard-street, E.C.*
1870	Masterman, Edward, jun., Esq. 57½, *Old Broad-street, E.C.; and Walthamstow.*
1869	*Matheson, Alexander, Esq., M.P. 33, *South-street, Park-lane, W.; and Ardross Castle, Ross-shire, N.B.*
1845	*Matheson, Sir James, Bart., F.R.S. 13, *Cleveland-row, S. W.; and Achany, Bonar-bridge, Sutherlandshire, &c.*
1871	1680Mathew, George Buckley, Esq. *Care of Messrs. Boddington and Co., St. Helen's-place, E.C.*
1872	Mathews, William, Esq., M.A. 49, *Harborne-road, Birmingham.*
1858	Mathieson, James Ewing, Esq. 77, *Lombard-street, E.C.; and* 16, *Queen's-gardens, Bayswater, W.*
1869	Maude, Col. Francis Cornwallis, R.A., V.C., &c. *Army and Navy Club, S.W.*
1873	Maude, Colonel G. A. *Royal Mews, Pimlico, S.W.*
1868	Mavrogordato, Lucas, Esq. *Belgrave-mansions, Grosvenor-gardens, S.W.; and Messrs. Ralli, Brothers,* 25, *Finsbury-circus, E.C.*
1871	Mawbey, Henry, Esq. 12, *Clare-road, Cotham, Bristol.*
1872	Maxwell, John, Esq. *Lichfield-house, Richmond.*
1860	*Maxwell, Sir William Stirling, Bart., M.P. 10, *Upper Grosvenor-street, W.; and Keir, Dunblane, N.B.*
1855	May, Staff-Commr. Daniel John, R.N. *Care of Case and Loudensack,* 1, *James-street, Adelphi, W.C.*
1858	1690Mayer, Joseph, Esq., F.S.A. 68, *Lord-street, Liverpool.*
1861	Mayers, William S. F., Esq., Chinese Secretary, H. B. M. Legation, Pekin. *Care of James West, Esq.,* 2, *Cowper's-court, Cornhill, E.C.*
1862	Mayne, Captain Richard Charles, R.N., C.B. 80, *Chester-square, S.W.*
1858	Mayo, Captain John Pole. *Army and Navy Club, S.W.*
1867	Mayson, John S., Esq., J.P. 5, *St. James'-square, Manchester.*

Year of Election.	
1872	McCall, John, Esq. 17, *Gracechurch-street, E.C.*
1863	Meade, The Hon. Robert Henry. *Colonial-office, S. W.; and* 3, *Belgrave-square, S. W.*
1872	Measom, George Samuel, Esq. *St. Margaret's, Isleworth.*
1871	Medhurst, W. H., Esq. *Athenæum Club.*
1862	*Medlycott, Commander Mervyn B., R.N. *Care of Messrs. Woodhead.*
1874	1700*Meinertzhagen, Daniel, Esq. 10, *Rutland-gate, S.W.*
1854	Melvill, Major-General Sir Peter Melvill, Mil. Sec. to the Bombay Gov. 27, *Palmeira-square, Brighton.*
1838	Melvill, Philip, Esq., F.R.A.S. *Ethy-house, Lostwithiel, Cornwall.*
1871	Mercer, Henry C., Esq., B.A. *Denham-lodge, Uxbridge.*
1868	Merewether, Colonel Sir William Lockyer, K.C.S.I., C.B. *Kurrachee. Care of King and Co.*, 65, *Cornhill*, E.C.
1871	Merritt, Douglas, Esq. *Lyndhurst, Irvington-on-Hudson, New York, U.S. Care of H. T. Thorlock, Esq.*, 9, *Canning-place, Liverpool.*
1866	Messiter, Charles A., Esq. *Barwick, near Yeovil, Somerset.*
1871	Messum, Josiah Young, Esq., R.N. (Controller of H.M.'s Packet Service). *General Post-office, E.C.; and Bedford-villa, Sydenham-road, Croydon.*
1867	Metcalfe, Frederic Morehouse, Esq. *Wisbech, Cambridgeshire.*
1871	Methven, Captain Robert. 44, *Chester-square, S.W.*
1837	1710*Mexborough, John Chas. Geo., Earl of. 33, *Dover-street, W.; and Methley-park, near Leeds.*
1865	*Michell, Lieut.-Colonel J. E., R.H.A.
1868	Michell, Robert, Esq. *India-office, S.W.*
1863	*Michie, A., Esq. 26, *Austin-friars, E.C.*
1873	Michie, Honourable Archibald, Q.C. 5, *Bury-street, St. James's; and Reform Club, S.W.*
1848	Middleton, Rear-Admiral Sir G.N. Broke, Bart. *H.M.S. 'Hero,' Sheerness; and Broke-hall, Suffolk.*
1870	*Midwinter, William Colpoys, Esq. *St. Michael's-rectory, Winchester; and Akyab, British Burmah.*
1868	*Miers, John William, Esq., C.E. 74, *Addison-road, Kensington, W.*
1859	Miland, John, Esq. *Clairville, Lansdown-road, Wimbledon.*
1866	Mildmay, Capt. Herbert St. John (Rifle Brigade). 19, *Charles-street, Berkeley-square, W.*
1872	1720Miles, Captain Samuel Barrett (Bombay Staff Corps), Political Agent in Mekran. *Care of Messrs. Trübner*, 60, *Paternoster-row, E.C.*
1874	Miller, Capt. David, R.N. *United Service Club, Pall-Mall, S.W.*
1861	*Miller, Captain Henry Matthew, R.N. *The United Service Club, S.W.; and Fernside, Sevenoaks.*
1868	Miller, Robert Montgomerie, Esq. *Culverden-grove, Tunbridge-wells.*
1853	*Miller, Admiral Thomas. *United Service Club, S.W.*
1861	Milligan, Joseph, Esq. 15, *Northumberland-street, W.C.*
1857	Mills, Arthur, Esq. 34, *Hyde-park-gardens, W.*

Year of Election.	
1863	*Mills, John R., Esq. *Kingswood-lodge, Tunbridge-wells.*
1860	Milman, Lieut.-Colonel Everard Stepney, Retired, Royal Artillery. 9, *Berkeley-square, W.*
1866	Milne, Admiral Sir Alex., K.C.B, G.C.B. *United Service Club, S.W.*
1867	1730 Milner, Rev. John, B.A. *H.M.S. 'St. Vincent.'*
1863	*Milton, Viscount, M.P. 17, *Grosvenor-street, W.*
1862	*Mitchell, George, Esq. 22, *Bolton-street, Piccadilly, W.*
1859	Mitchell, Sir William. *Strode, Ivybridge, Devon.*
1872	Mitchell, William Aug., Esq. *Marlboro'-villa, Lea-bridge-road, E.*
1873	Mitford, A. B., Esq. 1, *Albert-terrace, Knightsbridge; and Travellers' Club.*
1851	*Mocatta, Frederick D., Esq. 9, *Connaught-place, W.*
1873	Moffat, Rev. Dr. Robert. 64, *Knowle-road, Brixton-road, S.W.*
1853	Moffatt, George, Esq. 103, *Eaton-square, S.W.*
1868	Moffitt, John, Esq. "*General Register Office of Seamen,*" 6, *Adelaide-place, E.C.*
1873	1740 Moir, Maciae, Esq., M.A., &c. *Braefit, S. Hampstead, N.W.; Reform Club; The Century Club; The Highland Society of London; The Caledonian Society of London; The Scottish Corpor. Hall, E.C.; and 4, Brick-Court, Temple, E.C.*
1873	Moleyns, Major T. A. de, R.A. *Woolwich.*
1861	Mollison, Alexander Fullerton, Esq. *Woodcote, Tunbridge-wells.*
1870	Moneta, Don Pompeio (Chief Engineer, Argent. Repub.). *Buenos Ayres.*
1871	Montagu, Jno. M. P., Esq. *Downe-hall, Bridport, Dorset, and Union Club, S.W.*
1862	*Montague, Major Horace. 11 *Clifton-villas, Maida-hill, W.*
1830	*Montefiore, Sir Moses, Bart., F.R.S., F.R.S.N.A. 7, *Grosvenor-gate, Park-lane, W.; and East-cliff-lodge, Ramsgate.*
1859	Montgomerie, Major T. G., Engrs., 1st Assist. Trig. Survey. *Care of Messrs. Alexander Fletcher & Co.*, 10, *King's-arms-yard, Moorgate-street, E.C.*
1860	Montgomery, Robert Mortimer, Esq.
1865	Montgomery, Sir Robert, K.C.B., G.C.S.I. 7, *Cornwall-gardens, Queen's-gate, W.*
1839	1750 Moody, General R. C., R.E. *Caynham-house, near Ludlow, Shropshire.*
1857	*Moor, Rev. Allen P., M.A., F.R.A.S. *St. Clement's-vicarage, Truro.*
1874	Moore, Adolphus W., Esq. *India-office, S.W.*
1863	Moore, H. Byron, Esq. *Survey-office, Melbourne, Australia.*
1861	Moore, John Carrick, Esq., F.R.S. *Corswall, Wiltonshire; Geological Society, W.C.; and 23, Bolton-street, W.*
1870	Moore, John, Esq. 36, *Mark-lane, E.C.*
1870	*Moore, Joseph, Esq. *Brockwell-house, Dulwich.*
1872	Mora, Diego d'Ulson, Esq. 2, *Brook-street, Cheetham, Manchester.*
1870	Moran, Benjamin, Esq. 20, *Norfolk-terrace, Bayswater, W.; and 5, Westminster-chambers, Victoria-street, S.W.*
1872	*Morant, Capt. J. L. L. (R. Mad. Eng.). *Mountstuart, Ootacamund, Neilgherries, Madras Presidency. Care of Messrs. Thresher and Glenny*, 152, *Strand, W.C.*
1863	1760 More, R. Jasper, Esq. *Linley-hall, Salop.*
1869	*Morgan, Delmar, Esq. 19, *Queen's-gardens, Hyde-park, W.*
1864	Morgan, D. L., Esq., Deputy Inspector-General, R.N. 9, *Spring-gardens, S.W.*

Year of Election.	
1861	Morgan, Junius Spencer, Esq. 13, *Prince's-gate, Hyde-park, W.*
1866	Morland, Lieut. Henry, late I.N. *Assistant Dockmaster, &c., Bombay.*
1839	*Morris, Charles, Esq. *University Club, S.W.*
1871	Morris, Edwd. Ellis, Esq. *Bedfordshire Middle-class Public School, Bedford.*
1868	Morris, Eugene, Esq. *Care of M. Jull, Esq.*, 40, *Jermyn-street, W.*
1871	*Morrison, Alf., Esq. 16, *Carlton-house-terrace, S.W.*
1863	Morrison, Colonel J. C. D. 40, *Albion-road, Finchley-road, N.W.*
1867	1770Morrison, Pearson, Esq. *Bratton, Chittlehampton, N. Devon.*
1865	Morson, Thomas, Esq. 124, *Southampton-row, Russell-square, W.C.*
1873	Mosenthal, Adolph, Esq. 18, *Aberdeen-park, Highbury, N.*
1869	Moser, Robert James, Esq. 45, *Bedford-square, W.C.*
1869	Mott, F. T., Esq. 1, *De Montfort-street, Leicester.*
1861	*Mouat, Frederick J., Esq., M.D., Surgeon-Major and Inspector-General of Prisons, Bengal Army, &c. 12, *Durham-villas, Kensington, W.; and Athenæum Club, S.W.*
1868	*Mounsey, Aug. Henry, Esq. *British Embassy, Vienna. Care of R. H. Mounsey, Esq., Castle-street, Carlisle.*
1871	*Mowatt, James, Esq., M.A. 74, *Upper Gloucester-place, N.W.; and Caius College, Cambridge.*
1871	*Mozley, H. W., Esq., M.A. *Eton College.*
1858	Mudie, Charles Edward, Esq. *Muswell-hill.*
1858	1780Mueller, Ferdinand, Esq., M.D., PH.DR. *Director of the Botanical Gardens, Melbourne. Care of Messrs. Dulau and Co.*, 37, *Soho-square, W.*
1855	Muir, Thomas, Esq. 24, *York-terrace, Regent's-park, N.W.*
1867	*Muir, Thomas, jun., Esq. *Madeira; and* 24, *York-terrace, Regent's-park, N.W.*
1869	Müller, Albert, Esq. *Eaton-cottage, South Norwood, S.*
1873	Münster, His Excellency, Count. (Ambassador of the German Empire.) *German Embassy*, 9, *Carlton-house-terrace, S.W.*
1869	Munton, Francis Kerridge, Esq. 21, *Montagu-street, Russell-square, W.C.*
1866	*Murchison, John H., Esq. *Junior Carlton Club, S.W.*
1859	Murchison, Kenneth R., Esq. 24, *Chapel-street, Park-lane, W.; and Junior United Service Club.*
1830	*Murdoch, Sir Thomas W. Clinton, K.C.M.G. 8, *Park-street, Westminster, S.W.; and* 88, *St. George's Square, S.W.*
1860	Murray, George J., Esq. *Purbrook-house, Cosham, Hants; and Junior Carlton Club, S.W.*
1872	1790*Murray, G. S. D., Esq. *Care of J. W. Larkings, Esq., The Firs, Lee, S.E.*
1868	*Murray, Henry, Esq. *Garrick Club, Garrick-street, W.C.*
1844	*Murray, James, Esq.
1830	Murray, John, Esq. 50, *Albemarle-street, W.; and Newstead, Wimbledon, S.W.*
1870	Murray, T. Douglas, Esq. 34, *Portland-place, W.*
1860	*Murray, Lt. W., 68th Beng. N. Inf., Topo. Assist. G. Trig. Survey. *Mussoorie, India. Care of Messrs. H. S. King and Co.*

Year of Election.	
1870	Murray, William Vaughan, Esq., M.R.I., &c. 4, *Westbourne-crescent, Hyde-park, W.*
1865	Mussy, H. G. de, Esq., M.D.
1865	Nairne, P. A., Esq. 2, *Grove-hill, Camberwell, S.*
1868	Napier, of Magdala, Lord, G.C.B., F.R.S.
1861	1800 Napier, William, Esq.
1870	Napier, Wm. Jno. Geo. (Master of Napier.) 1, *Queen Square, Westminster, S.W.; and Thirlestone-castle, Selkirkshire.*
1871	Nares, Captain G. S., R.N. *Care of the Hydrographer, Admiral G. H. Richards.*
1859	*Nasmyth, Capt. David J., 1st Assist. Trigonometrical Survey. 5, *Charlotte-street, Edinburgh.*
1872	Nayler, Geo., Esq. (Surgeon). 3, *Savile-row, W.*
1873	Nelson, George Henry, Esq. 1, *Hillside, Wimbledon, S.W.*
1857	*Nesbitt, Henry, Esq. 12, *Victoria-villas, Kilburn, N.W.*
1869	Neville, Lieut.-Col. Edward. 30, *Clarges-street, Piccadilly, W.*
1870	Newall, Wm. Johnstone, Esq. 33, *South-street, Park-lane, W.*
1868	Newbatt, Benjamin, Esq., F.S.S., &c. 7, *Vicarage-gardens, Campden-hill, W.*
1867	1810 Newdigate, Lieut.-Col. Francis W. (Coldstream Guards). 26, *Seymour-street, W.; and Byrkley-lodge, Needwood Forest, Burton-upon-Trent.*
1856	Newman, Thomas Holdsworth, Esq. 9, *Gt. Cumberland-place, Hyde-park, W.*
1873	Newton, Alfred P., Esq. 15, *Sheffield-gardens, Campden-hill, W.*
1872	Newton, Wm., Esq. 11, *Mitre-court, Temple, E.C.*
1870	Nicholas, W., Esq. 2, *Shirley-villas, Prospect-hill, Walthamstow, E.*
1870	Nicholl, Henry John, Esq. 16, *Hyde-park-gate, W.*
1870	Nichols, James, Esq. 22, *Laurence Pountney-lane, E.C.; and "The Mount," Kenley, Surrey.*
1865	*Nichols, Robert C., Esq. 5, *Sussex-place, W.*
1856	Nicholson, Sir Charles, Bart., D.C.L., Chancellor of the University, Sydney. 26, *Devonshire-place, Portland-place, W.*
1868	Nicol, Geo. Wm., Esq. *Care of Messrs. Glyn, Mills, & Co., 67, Lombard-st. E.C.*
1869	1820 *Nicol, Robert, Esq. *Reform Club, S.W.; and Westminster-palace-hotel, S.W.*
1868	Nicol, Wm., Esq. 41, *Victoria-st., S.W.; and Fawsyde, Kenneff, Kincardine.*
1871	Nicols, Arthur Robert, Esq. 11, *Church-row, Hampstead, N.W.*
1836	Nicolson, Vice-Admiral Sir Frederick Wm. Erskine, Bart., C.B. 15, *William-street, Lowndes-square, S.W.*
1873	Nimmo, Rev. R., B.A., R.N. *Mill-house, Grantchester, near Cambridge, and H.M.S. 'Bellerophon.'*
1864	Nissen, H. A., Esq. *Mark-lane, E.C.*
1858	Nix, John H., Esq. 77, *Lombard-street, E.C.*
1857	*Nolloth, Captain Matthew S., R.N. 13, *North-terrace, Camberwell, S.E.; and United Service Club, S.W.*

Year of Election.	
1865	Norman, H. J., Esq. 4, *Halkin-street, Grosvenor-place, S.W.*
1872	Norris, Charles, Esq. 124, *Wood-street, E.C.; and Marischal-road, Lee, Kent.*
1860	1830 Norris, Harry, Esq. *Colonial-office, S.W.; and 4, Little St. James's-street. S.W.*
1861	North, Alfred, Esq. 23, *Lansdowne-crescent, Notting-hill, W.*
1865	Northumberland, Algernon George, Duke of. *Northumberland-house, S.W.*
1862	Notman, Henry Wilkes, Esq. 7, *Great Marlborough-street, W.*
1862	Nourse, Henry, Esq. *Conservative Club, S.W.*
1858	*Oakeley, R. Banner, Esq. 13, *Ryder-street, St. James's, S.W.*
1872	Oates, Frank, Esq. *Meanwood-side, near Leeds.*
1858	Ogilvie, Edward D., Esq. *Yulgillar, Clarence-river, New South Wales. Care of Messrs. Marryat and Sons, Laurence Pountney-lane, E.C.*
1863	Ogilvy, Col. Thos. 23, *Grafton-st., Piccadilly, W.; and Ruthven, Forfarshire, N.B.*
1873	Older, W. Aug, Esq. *Carrington-lodge, Richmond.*
1861	1840 Oldershaw, Capt. Robert Piggott. 74, *Warwick-square, Belgrave-road, S.W.*
1872	Oldfield, Captain Rudolphus, R.N. *United Service Club, S.W.*
1870	Oldham, Henry, Esq., M.D. 26, *Finsbury-square, E.C.*
1870	Oldham, Robert W., Esq. *Lloyd's, E.C.*
1855	Oliphant, Laurence, Esq. *Athenæum Club, S.W.*
1866	Oliver, Captain S. P., 12th Brigade R.A. *Care of Rev. W. Oliver, Bovinger-rectory, Ongar, Essex.*
1845	*Ommanney, Admiral Erasmus, C.B., F.R.S., F.R.A.S. 6, *Talbot-square, Hyde-park, W.; and United Service Club, S.W.*
1838	*Ommanney, H. M., Esq. *Blackheath, S.E.*
1867	Ormathwaite, John Benn-Walsh, Lord. 28, *Berkeley-square, W.*
1873	*Ormerod, Henry Mere, Esq. *Broughton-park, Manchester.*
1873	1850 Orpen, F. H. S., Esq. *Barkly, Griqualand West, South Africa.*
1853	Osborn, Sir George R., Bart. *Travellers' Club, S.W.; and Chicksand-priory, Beds.*
1870	Osborn, Commander Noel, R.N. 119, *Gloucester-terrace, Hyde-park, W.*
1856	Osborn, Admiral Sherard, C.B., F.R.S. 8, *Arundell Terrace, Brighton; Athenæum and Reform Clubs, S.W.*
1861	*Osborne, Lieut.-Col. Willoughby. *Political Agent, Bhopal, Schira, India.*
1852	Oswell, William Cotton, Esq. *Groombridge, Kent.*
1860	*Ouvry-North, Rev. J. *East Acton, Middlesex, W.*
1870	*Overbeck, M. the Chev. G. de. *Hong-Kong. Care of Messrs. King and Co., 65, Cornhill, E.C.*
1844	*Overstone, Samuel, Lord, M.A., M.R.I. 2, *Carlton-gardens, S.W.; and Wickham-park, Surrey.*
1873	Oxenham, Edward Lavington, Esq. *Nutcombe-house, Weybridge, Surrey.*
1868	1860 Owden, Thomas S., Esq. *Mount-pleasant, Philip-lane, Tottenham.*

Year of Election.	
1874	Packe, William, Esq. 1, *Cavendish-square, S.W.*
1873	Page, George Gordon, Esq., C.E. 4, *Great James-street, Gray's-inn, W.C.*
1870	Palmer, F. J., Esq., R.N. 8, *Cullum-street, E.C.*
1865	*Palmer, Captain George, R.N. *H.M.S. 'Rosario,' Australia; and Cavers, Hawick, Roxburghshire, N.B.*
1870	*Palmer, John Linton, Esq., Surg. R.N. 40, *Rock-park, Rockferry, Cheshire.*
1872	Palmer, Joseph, Esq., B.A., &c. *Wells, Somerset.*
1862	Palmer, Rev. Jordan, M.A., F.S.A., Chaplain to St. Ann's Royal Society. *Streatham, S.*
1873	Palmer, J. Horsley, Esq. 56, *Cromwell-road, Queen's-gate, S.W.*
1838	*Palmer, Samuel, Esq.
1869 1870	*Palmer, T. G. A., Esq. 5, *Paper-buildings, Inner Temple, E.C.*
1870	Pannel, Charles S., Esq. *Walton-lodge, Torquay.*
1865	*Papengouth, Oswald C., Esq., C.E. *Care of W. Hornibrook, Esq.*, 6, *Regent's-square, W.C.*
1870	Parfitt, W. S., Esq., C.E. *Montevideo. Care of Mrs. Parfitt, Devizes, Wilts.*
1863	*Paris, H.R.H. le Comte de.
1864	Parish, Captain A. *Bembridge, Isle of Wight.*
1849	*Parish, Capt. John E., R.N. *Army and Navy Club, S.W. Care of Messrs. Stilwell, Arundel-street, Strand.*
1833	Parish, Sir Woodbine, K.C.H., F.R.S., &c. *Quarry-house, St. Leonards-on-Sea.*
1873	Park, James Dickson, Esq. 48, *Queen's-gate-gardens, South Kensington, W.*
1866	Parker, Capt. Francis G. S., 54th Regiment, F.G.S., A.I.C.E. *Jullundhur, Punjab.*
1873 1880	Parker, James, Esq, 45, *Leinster-square, Hyde-park, W.*
1850	Parkes, Sir Harry S., K.C.B., &c.
1873	Parkin, George Lewis, Esq. 22, *Park-lane, W.*
1850	*Parkyns, Mansfield, Esq., F.Z.S. *Arthur's Club, St. James's-street, S.W.; and* 59, *Prince's-square, Bayswater, W.*
1872	Parry, Edward, Esq. 284, *Camden-road, N.W.*
1872	*Parry, Francis, Esq. *Junior Athenæum Club; and* 102, *Piccadilly, W.*
1873	Pasco, Captain Crawford, R.N. *Care of Cuse and Loudensack*, 1, *James-street, Adelphi, W.; Proc. to Capt. J. E. Davis*, R.N., *Hydrographic Office.*
1874	Pass, Elias de, Esq. 2, *Kensington-gardens-terrace, Hyde-park, W.; and The Lodge, Bembridge, Isle of Wight.*
1859	Pasteur, Marc Henry, Esq. 38, *Mincing-lane, E.C.*
1867	Paterson, John, Esq. 19A, *Coleman-street, City, E.C.*
1857 1890	Paton, Andrew A., Esq. *H.B.M.'s Vice-Consul, Missolonghi, Greece.*
1871	Patterson, Jas. Wilson, Esq. *Roselund, Waverley, Baltimore Co., U.S.A.*
1863	Pattinson, J., Esq. 21, *Bread-street, E.C.*
1868	Paul, J. H., Esq., M.D. *Camberwell-house, Camberwell, S.*
1858	Paul, Joseph, Esq. *Ormonde-house, Ryde, Isle of Wight.*
1872	Paxton, Robert Chas., Esq. 24, *Stafford-terrace, Phillimore-gardens, W.*
1847	*Paynter, William, Esq., F.R.A.S. 21, *Belgrave-square, S.W.; and Camberne-house, Richmond, Surrey, S.W.*
1853	Peacock, George, Esq. *Starcross, near Exeter.*

Year of Election.	
1872	Pears, Rev. S. A., D.D., Head Master of Repton School. *Repton, Derbyshire.*
1863	Pearse, Captain R. B., R.N. 9, *Hyde-park-street, W.*
1874	1900 Pearson, Colonel Alfred. 46, *Hyde-park-square, W.; and United Service Club, S.W.*
1853	*Peckover, Alexander, Esq., F.L.S. *Wisbeach.*
1860	*Peek, Sir Henry William, Bart., M.P. *Care of G. Thorpe, Esq., 21, Eastcheap, E.C.*
1872	*Peel, Captain Francis. *Grymsdyke, Lacey-green, Princes Risborough, Bucks.*
1858	Peel, Right Hon. Sir Robert, Bart., M.P. 4, *Whitehall-gardens, S.W.; and Drayton-manor, Tamworth.*
1871	Pembroke, George R. C. Herbert, Earl of. *Wilton-house, Salisbury; and* 10, *Victoria-square, Pimlico, S.W.*
1868	*Pender, John, Esq. 18, *Arlington-street, W.*
1863	*Pennant, Colonel S. S. Douglas. *Penrhyn-castle, Bangor, N.B.*
1859	*Penrhyn, Lord. *Penrhyn-castle, Bangor.*
1874	Pepys, Hon. Walter Courtenay. *Windham Club, St. James's-square, S.W.*
1853	1910 Percy, Lieut.-General the Hon. Lord Henry M. (Guards). 40, *Eaton-square, S.W.*
1865	Pereira, Francisco E., Esq.
1860	Perkins, Sir Frederick, M.P. *Southampton.*
1865	Perkins, William, Esq. *Rosario, Argentine Republic. Care of the Central Argentine Railway Co., Palmerston-buildings, Old Broad-street.*
1859	Perry, Sir Erskine, Member Indian Council. 36, *Eaton-place, S.W.*
1865	Perry, Gerald R., Esq., British Consulate, Stockholm.
1859	Perry, Sir William, H.B.M.'s Consul-General, Venice. *Athenæum Club, S.W.*
1862	*Perry, William, Esq. 9, *Warwick-road, Upper Clapton, N.E.*
1862	Peter, John, Esq. *Conservative Club, S.W.*
1857	*Peters, William, Esq.
1860	1920 *Petherick, John, Esq. 48, *Lancaster-road, Westbourne-park, W.*
1860	Petrie, Major Martin, 97th Regiment. *Hanover-lodge, Kensington-park, W.*
1871	Petter, G. Wm., Esq. *Streatham-grove, S.*
1866	Pharazyn, Robert, Esq. *Wellington, New Zealand. Care of Messrs. Scale and Rogers,* 24, *Mark-lane, E.C.*
1867	Phayre, Maj.-Gen. Sir Arthur, C.B., K.C.S.I. *E. India United Service Club, S.W.*
1854	Phelps, William, Esq. 18, *Montagu-place, Russell-square, W.C.*
1862	*Phené, John Samuel, Esq., F.G.S. 5, *Carlton-terrace, Oakley-street, S.W.*
1873	*Philbrick, Frederick Adolphus, Esq. 28, *Avenue-road, N.W.*
1860	Philip, George, Esq. 32, *Fleet-street, E.C.*
1872	Philipps, Herbert Rees, Esq. *India-office, S.W.*
1872	1930 Philipps, Sutherland Rees, Esq., M.D. *Exminster, Exeter.*
1857	Phillimore, Captain Augustus, R.N. *Hurley Manor-house, Great Marlow; and United Service Club, S.W.*
1859	Phillimore, Charles Bagot, Esq. *Hurley Manor-house, Great Marlow; and India-office, S.W.*

Year of Election	
1860	Phillimore, Wm. Brough, Esq., late Capt. Grenadier Guards. 5, *John-street, Berkeley-square, W.*
1854	Phillips, Major-General Sir B. Travell. *United Service Club, S.W.*
1869	Phillips, Edwd. Aug., Esq. *Chantry-lodge, 34, Abbey-road, St. John's-wood, N.W.*
1873	Phillips, Geo., Esq. *Belle-vue-lodge, Beaufort-street, Chelsea, S.W.*
1873	Philp, Capt. Fras. Lamb. (*Royal Scots Greys*) *Aldershot. Care of Cox and Co., Craig's-court; and Army and Navy Club, S.W.*
1871	Philpott, Edward P., Esq., M.D., LL.D. *Poole, Dorsetshire.*
1872	*Pickering, John, Esq. 28, *Springfield-mount, Leeds.*
1871	1940Pickersgill, Wm. Cunliffe, Esq. 58, *Prince's-gate, S.W.*
1871	Pierce, Josiah, Esq. 12, *Beaufort-gardens, Brompton-road, S.W.*
1869	Piggot, John, jun., Esq., F.S.A., &c. *The Elms, Ulting, Maldon, Essex.*
1870	Pigott, Robt. Turtle, Esq. *Torrington-villas, Lee, Kent; and 36, Southampton-street, Strand, W.C.*
1864	*Pigou, F. A. P., Esq. *Dartford, Kent.*
1852	*Pike, Captain John W., R.N. *United Service Club, S.W.*
1855	Pilkington, James, Esq. *Blackburn.*
1865	Pilkington, William, Esq. *War-office.*
1852	*Pim, Captain Bedford C. T., R.N. *Belsize-square, Hampstead, N.W.; and Senior and Junior United Service Club, S.W.*
1870	Pimblett, James, Esq. *Tutenhill, Burton-on-Trent.*
1859	1950Pinney, Colonel William. 30, *Berkeley-square, W.*
1867	Plant, Nathaniel, Esq. *Hotel Exchange, Rio de Janeiro; and De Montfort-house, Leicester.*
1871	Platt, Lieut.-Colonel Chas. Rowley. 4, *Bolton-street, Piccadilly, W.*
1872	Plaister, W. H., Esq., M.R.C.S., &c. *Tottenham, Middlesex.*
1865	Player, John, Esq. 22, *Carpenter-road, Edgbaston, Birmingham.*
1860	Playfair, Lieut.-Col. Robert Lambert. H.B.M. Consul-General, Algiers. *Care of Messrs. H. S. King and Co., 45, Pall-mall, S.W.*
1866	Plowden, Charles C., Esq. *Belgrave-mansions, Grosvenor-gardens, S.W.*
1856	*Plowes, John Henry, Esq. 39, *York-terrace, Regent's-park, N.W.*
1870	Plunkett, Major-Gen. the Hon. Charles Dawson. *United Service Club, S.W.*
1855	*Pollexfen, Captain J. J. *India.*
1866	1960*Pollington, John Horace, Viscount. 8, *John-street, Berkeley-square, W.*
1835	*Ponsonby, The Hon. Frederick G. B. 3, *Mount-street, Grosvenor-square, W.*
1860	Pook, Captain John. 6, *Colfe's-villas, Lewisham-hill, S.E.*
1870	Poole, C. M., Esq., C.E. 8, *Cambridge-terrace, Notting-hill, W.*
1857	Pope, Captain Wm. Agnew. 18, *Portland-place, W.*
1863	*Porcher, Captain Edwin A., R.N. 60, *Chester-square, S.W.*
1874	*Porges, Theodore, Esq. 43, *St. James's-place, S.W.; and Austin Friars, E.C.*
1871	*Portal, Wm. Richd., Esq., M.A. *Tonge-house, Lower Norwood, S.*
1868	Potter, Archibald Gilchrist, Esq. *Woodham-lodge, Lavender-hill, Wandsworth, S.W.*
1867	Potter, Wm. H., Esq. *Care of G. T. White, Esq., Kinrara, Tooting-common.*

Year of Election.	
1861	1970*Pounden, Captain Lonsdale. *Junior United Service Club, S. W.; and Brownswood, Co. Wexford.*
1862	Povah, Rev. John V., M.A. 11, *Endsleigh-street, W.C.*
1864	*Powell, F. S., Esq. 1, *Cambridge-square, Hyde-park, W.*
1874	Power, Edward, Esq. 45, *Belsize-park, Hampstead.*
1859	Power, E. Rawdon, Esq. (Retired List, Ceylon Civil Service). *Heywood-lodge, Tenby, South Wales; and Thatched-house Club, S. W.*
1868	Pownall, John Fish, Esq. 63, *Russell-square, W.C.*
1864	Powys, The Hon. C. J. F.
1864	Powys, The Hon. Leopold.
1870	*Prance, Reginald H., Esq. *Frognal, Hampstead.*
1873	Preedy, Colonel H. William. *The Chantrey, Hadbury, Worcestershire.*
1873	1980Prentice, Edward, Esq. *Care of Rev. H. Waller, The Vicarage, Leytonstone.*
1873	*Prevost, Admiral J. C. 1, *Burton-street, Eaton-square, S.W.*
1868	Price, Charles S., Esq. *Bryn Derwen, Neath.*
1869	Price, F. G. H., Esq. 1, *Fleet-street, E.C.*
1873	Price, James, Esq. 35, *Chepstow-place, Bayswater, W.*
1852	Price, James Glenie, Esq., Barrister-at-Law. 14, *Clement's-inn, W.C.*
1869	Prichard, Iltudus Thomas, Esq. 29, *Granville-park, Blackheath, S.E.*
1860	*Prickett, Rev. Thomas William, M.A., F.S.A. 11, *Lypatt-terrace, Cheltenham; and United University Club, Pall-mall East, S.W.*
1868	Prideaux, Capt. W. F., Bombay Staff Corps. *Care of Messrs. King and Co., 45, Pall-mall, S.W.*
1873	Prince, John Sampson, Esq. 28, *Gloucester-place, Hyde-park, W.*
1865	1990*Pringle, A. Esq. *Yair, Selkirk, N.B.*
1855	*Pringle, Thomas Young, Esq. *Reform Club, S.W.*
1866	*Prinsep, Edw. Aug., Esq., B.C.S., Commissioner of Settlements in the Punjaub, *Umritsur. Care of Messrs. H. S. King and Co., 65, Cornhill, E.C.*
1868	Pritchard, Lieut.-Col. Gordon Douglas. *Bengal.*
1872	Proctor, Samuel, Esq. (Head Master, Borough Schools, San Fernando, Trinidad). *Care of E. H. Penney, Esq., 17, Lime-street, E.C.*
1861	*Prodgers, Edwin, Esq. *The Rectory, Ayott St. Peter's, Herts.*
1852	Prout, John William, Esq., M.A., Barrister-at-Law. *Athenæum Club, S.W.; and Neasdon, Middlesex, N.W.*
1861	Pryce-Jones, John, Esq. *Grove-park School, Wrexham.*
1862	*Puget, Lieut.-Colonel J., 8th Hussars. *Longford, Ireland.*
1872	Puleston, John H., Esq. 2, *Palace-gate, Kensington, W.*
1860	2000Puller, Arthur Giles, Esq. *Athenæum Club, S.W.; Arthur's Club, S.W.; and Youngsbury, Ware.*
1872	Punsfer, Wm. B., Esq. 1 *and* 2, *Grosvenor-villas, Merton-road, Wandsworth, S.W.*
1857	Purcell, Edward, Esq., LL.D. *Whitchurch, Monmouth.*
1869	Purdon, Lieut. George Frederic, R.N.
1865	*Pusey, Sidney E. Bouverie, Esq.
1870	Pycroft, Sir Thomas, K.C.S.I. 17, *Cleveland-gardens, Hyde-park, W.*

Year of Election.	
1861	Quin, Lord George. 15, *Belgrave-square, S.W.*
1868	Quin, John Thomas, Esq. *Care of Mr. Lambson, Epsom.*
1862	Quin, T. Francis, Esq. *Bathurst-house*, 418, *Clapham-road, Clapham, S.*
1871	Radcliffe, Sir Joseph P., Bart. *Caverswall-castle, Cheadle, Staffordshire.*
1858	2010*Radstock, Graville Augustus, Lord. 30, *Bryanston-square, W.*
1869	Rae, Edward, Esq. *Claughton, near Birkenhead.*
1862	*Rae, James, Esq. 32, *Phillimore-gardens, Kensington, W.*
1853	Rae, John, Esq., M.D., LL.D. 2, *Addison-gardens-south, Holland-villas-road, Kensington, W.*
1870	Raikes, Francis Wm., Esq. *Junior Carlton Club.*
1867	Raleigh, Rev. A., D.D. *Arran-house, Highbury-new-park.*
1871	Ralli, Eustratius, Esq. 93, *Lancaster-gate, W.*
1871	Ralli, Pandeli, Esq. 17, *Belgrave-square, S.W.*
1870	Ralston, W. R. Shedden, Esq., M.A. *British Museum, W.C.*
1873	Rambaut, John, Esq., M.D. *The Grange, Godstone, Surrey.*
1866	2020Ramsay, Alex., Esq. 45, *Norland-square, Notting-hill, W.*
1873	Ramsay, F. W. Hutchinson, Esq., M.D. 15, *Somerset-street, Portman-square, W.*
1866	*Ramsay, Admiral G. *United Service Club, S.W.*
1867	Ramsay, John, Esq. *Islay, N.B.*
1867	*Ramsden, Richard, Esq., B.A. *Camp-hill, Nuneaton, Warwickshire.*
1869	Randell, Thomas, Esq. *Castle-green, Taunton.*
1868	Rankin, William, Esq. *Tiernaleague, Carndonagh, Donegal.*
1866	*Ransom, Edwin, Esq. *Kempstone, near Bedford.*
1869	Rassam, Hormuzd, Esq., Assistant Political Resident, Aden. *Care of Rev. F. Moran, St. Margaret's, Twickenham, S.W.*
1859	Ratcliff, Colonel Charles, F.S.A. *Athenæum Club, S.W.; Edgbaston, Birmingham; and Downing College, Cambridge.*
1870	2030Ratcliffe, Rev. Thomas, B.D., &c.
1861	Rate, Lachlan Macintosh, Esq. 9, *South Audley-street, W.*
1873	Ravenscroft, W. H., Esq. 19, *Lansdowne-road, W.*
1846	Ravenshaw, E. C., Esq., M.R.A.S. *Oriental Club, W.; and* 36, *Eaton-sq., W.*
1859	Ravenstein, Ernest G., Esq. *Alpha-cottage, Lorn-road, Brixton, S.W.*
1861	Rawlinson, Sir Christopher. *Everleigh-house, Marlborough, Wilts; Manydown-park, Basingstoke; and United University Club, S.W.*
1844	*Rawlinson, Major-General Sir Henry C., K.C.B., D.C.L., LL.D., F.R.S. *Athenæum Club, S.W.; and* 21, *Charles-street, Berkeley-square, W.*
1838	Rawson, His Excellency Rawson Wm., C.B., Governor-in-Chief of the Windward Islands. *Barbadoes.*
1869	Ray, Captain Alfred William. *The Lodge, Brixton-oval, S.W.*
1872	Ray, George H., Esq., M.D., Bengal. 14, *St. James's-square, S.W.*
1873	2040Read, Frederick, Esq. 45, *Leinster-square, W.*

Year of Election.	
1863	Reade, W. Winwood, Esq. 13, *Alfred-place, Bedford-square, W.C.*
1865	Redhead, R. Milne, Esq. *Springfield, Seedley, Manchester; Conservative Club, S.W.; and Junior Carlton Club, S.W.*
1868	*Redman, John B., Esq., C.E. 6, *Westminster-chambers, Victoria-street, S.W.*
1871	Reed, Andrew Holmes, Esq. *Earlsmead, Page-green, N.*
1859	Reeve, John, Esq. *Conservative Club, S.W.*
1866	*Rehden, George, Esq. 2, *Great Tower-street, E.C.*
1861	*Reid, David, Esq. 95, *Piccadilly, W.*
1857	Reid, Lestock R., Esq. *Athenæum Club, S.W.; and* 122, *Westbourne-terrace, W.*
1871	*Reid, Robert, Esq., B.A., F.Z.S. *Iffley, Oxford.*
1861	2050 Reilly, Anthony Adams, Esq. *Belmont, Mullingar.*
1869	*Reiss, James, Esq. 7, *Cromwell-road-houses, South Kensington, W.*
1872	Remfry, Jno., Esq. *The Grange, Nightingale-lane, S.W.*
1830	*Rennie, Sir John, C.E., F.R.S., F.S.A.
1866	*Rennie, John Keith, Esq., M.A. Camb. 56, *Gloucester-terrace, Hyde-park, W.*
1834	*Rennie, M. B., Esq., C.E. *Care of James Rennie, Esq.*, 9, *Motcomb-street, Belgrave-square, S.W.*
1864	Rennie, W., Esq. 6, *Great Cumberland-place, W.*
1830	*Renwick, Lieutenant, R.E.
1861	Reuter, Julius, Baron de. *Kensington-palace-gardens, W.*
1858	Reynardson, Henry Birch, Esq. *Adwell, near Tetsworth, Oxfordshire.*
1874	2060 Reynolds, James, Esq. 174, *Strand, W.C.*
1872	Reynolds, Wm. Hy., Esq. *Care of Messrs. King & Co.*, 65, *Cornhill, E.C.*
1867	Rhodes, Arthur John, Esq. 38, *Ordnance-road, St. John's-wood, N.W.*
1870	Rice, Joseph Marcus, Esq., M.D. 17, *Pleasant-street, Worcester City, Mass., U.S. Care of Messrs. Haseltine, Lake, and Co.*, 8, *Southampton-buildings, W.C.*
1870	Rice, Wm., Esq. 2, *Albert-villas, Evelyn-road, Richmond, S.W.; and Stanford's Geograph. Establishment, Charing-cross, S.W.*
1868	Richards, Alfred, Esq. *Tewkesbury-lodge, Forest-hill.*
1860	Richards, Rev. George, D.D. *Pelham-vicarage, Buntingford.*
1857	Richards, Admiral George H., F.R.S., C.B. 12, *Westbourne-terrace-road, W.*
1874	Richards, M. W. Esq. *Shore-road, Hackney, E.*
1864	Richardson, F., Esq. *Juniper-hall, Micklcham, Dorking.*
1873	2070 Richardson, W. Brown, Esq. *Darlaston-rectory, Wednesbury, Staffordshire.*
1859	Rickards, Edward Henry, Esq. 4, *Connaught-place, Hyde-park, W.*
1873	Riddell, Lieut. H. S. Hutton. *Halifax. Nova Scotia. Care of E. M. H. Riddell, Esq., Newark-upon-Trent, Nottinghamshire.*
1865	*Rideout, W. J., Esq. 51, *Charles-street, Berkeley-square, W.*
1864	Ridley, F. H., Esq. 44, *Alexandra-road, St. John's-wood, N.W.*
1864	Ridley, George, Esq. 2, *Charles-street, Berkeley-square, W.*
1874	Ridpath, James Lionel, Esq. 33, *George-street, Hanover-square, W.*
1862	*Rigby, Major-General Christopher Palmer. *Oriental Club, W.; and* 14, *Mansfield-street, W.*

Year of Election.	
1868	Riley, Captain Charles Henry. *Junior United Service Club, S.W.*
1860	Rintoul, Robert, Esq. *Windham Club, S.W.*
1853	2080Ripon, Geo. Fredk. Sam., Marquis of, F.R.S. 1, *Carlton-gardens, S.W.; and Studley Royal, Ripon.*
1868	*Roberts, Charles W., Esq. *Penrith-house, Effra-road, Brixton, S.W.*
1861	Roberts, Capt. E. Wynne. *Junior Carlton Club, S.W.; and* 18, *Great Cumberland-street, Hyde-park, W.*
1865	Robertson, A. Stuart, Esq., M.D. *Horwich, near Bolton.*
1860	Robertson, D. Brooke, Esq., H.B.M.'s Consul. *Canton. Care of Messrs. H. S. King and Co.*
1861	*Robertson, Graham Moore, Esq. 21, *Cleveland-square, Hyde-park, W.*
1870	*Robertson, James Nisbet, Esq. 23, *Porchester-square.*
1868	Robertson, Rev. J. S. S., M.A., F.R.A.S. *Duncrub-castle, Duncrub-park, Dunning, Perthshire, N.B.*
1863	Robertson, R. B., Esq. *H.M.'s Legation, Yokohama, Japan.*
1873	Robertson, Major Wheatley. 35 *Queen's-gardens, W.*
1870	2090Robinson, Alfred, Esq. *Mountjoy-house, Huddersfield.*
1830	*Robinson, Vice-Admiral Charles G. 30, *Blomfield-terrace, Westbourne-terrace, W.*
1873	Robinson, Capt. F. C. B., R.N. *Junior United Service Club, S.W.*
1872	Robinson, Henry, Esq., M.I.C.E., F.G.S. 7, *Westminster-chambers, S.W.*
1871	Robinson, Rev. Henry Mowld, M.A. *Chigwell, Essex.*
1864	Robinson, H. O., Esq. 6, *South-street, Finsbury, E.C.*
1859	Robinson, Sir Hercules G. R., K.C.M.G. *Governor of New South Wales. Messrs. Burnett,* 17, *Surrey-street, W.C.*
1865	Robinson, J. R., Esq., LL.D., F.S.A. Scot., LL.D., F.R.S.A. du Nord, Copenhagen, F.G.S. Edin., Membre Société Asiatique de Paris, &c. *South-terrace, Dewsbury.*
1862	Robinson, Lieut.-Col. Sir John Stephen, Bart. *Arthur's Club, S.W.; and* 20, *Park-lane, W.*
1864	Robinson, John, Esq. *Care of E. Street, Esq.,* 30, *Cornhill, E.C.*
1860	2100Robinson, Mr. Serjeant. 8, *King's-Bench-walk, Temple, E.C.; and* 43, *Mecklenburgh-square, W.C.*
1855	Robinson, Thomas F., Esq., F.L.S. *Belmont-lodge, Anerley, S.E.*
1850	*Robinson, Captain Walter F., R.N. 15, *Montpellier-villas, Brighton.*
1872	Robinson, Wm., Esq. *Colonial-office, S.W.*
1870	Robinson, Hon. W. C. F. (Governor of Prince Edward Island). *Care of the Colonial-office.*
1830	*Rodd, James Rennell, Esq. 29, *Beaufort-gardens, S.W.*
1860	Roe, Capt. Jno. Septimus, Surveyor-General, W. Australia. *Care of Mrs. Ellis Jervoise,* 7, *Euston-place, Leamington.*
1873	Rogers, Capt. Brudenell. 14, *St. James's-square, S.W.*
1874	Rogers, Captain Ebenezer. *Longford, Ireland.*
1863	Rogers, John T., Esq. *River-hill, Sevenoaks.*
1872	2110Rolleston. W. Vilett, Esq.

Year of Election	
1861	Rollo, Lord. *Dumcrieff-castle, Moffat, N.B.*
1863	Rönn, M. Hermann von. 21, *Kensington-park-gardens, W.*
1866	Rooke, Major W., R.A. *Formosa, Lymington, Hants.*
1871	Rooks, Geo. Arthur, Esq. 24, *Lincoln's-inn-fields, W.C.*
1873	Rosa, Dr. Don Manuel Gonsalvez de la. (Professor of Philosophy, University of San Marcos, Lima.) 80, *Guildford-street, Russell-square, W.C.*
1872	Rose, H. Cooper, Esq., M.D. *Hampstead, N.W.*
1868	Rose, Henry, Esq. 8, *Porchester-square, Hyde-park, N.W.*
1861	Rose, Jas. Anderson, Esq. *Wandsworth, Surrey, S.W.; and* 11, *Salisbury-street, W.C.*
1870	Rose, The Right Hon. Sir John. 18, *Queen's-gate, Hyde-park, W.*
1857	2120*Rose, Colonel Sir Wm. Anderson, Alderman, F.R.S.L. *Carlton Club, S.W.; 63, Upper Thames-street, E.C.; and Upper Tooting, S.W.*
1864	Ross, B. R., Esq. *Care of the Hudson-bay Company, Hudson-bay-house,* 1, *Lime-street, E.C.*
1870	Ross, Capt. Geo. Ernest Augustus (King's Own Light Inf. Militia). *Bryn-Ellwn, Clapham-park, S.W.*
1867	Rossiter, Wm., Esq., F.R.A.S. *South London Working Men's College,* 91, *Blackfriars-road, S.E.*
1864	*Roundell, C. S., Esq. 63, *Cromwell-road, South Kensington, S.W.*
1862	Roupell, Robert Priolo, Esq., M.A., Q.C. *J 5, Albany, W.*
1839	*Rous, Vice-Admiral the Hon. Henry John. 13, *Berkeley-square, W.*
1864	*Routh, E. J., Esq., M.A., F.R.S., F.R.A.S., &c. *St. Peter's College, Cambridge.*
1874	Routledge, Edmund, Esq. 40, *Clanricarde-gardens, Bayswater, W.*
1872	*Row, A. V. Nursing, Esq. *Daba-garden, Vizagapatam, India. Care of King and Co.,* 65, *Cornhill, E.C.*
1862	2130Rowe, Sir Joshua, C.B., late Chief Justice of Jamaica. 10, *Queen Anne-street, Cavendish-square, W.*
1868	*Rowlands, Percy J., Esq. *India-office, S.W.*
1863	Rowley, Captain C., R.N. 33, *Cadogan-place, S.W.*
1856	Rucker, J. Anthony, Esq. *Blackheath, S.E.*
1861	*Rumbold, Charles James Augustus, Esq. 5, *Percival-terrace, Brighton.*
1861	Rumbold, Thomas Henry, Esq. 38, *Sussex-square, Brighton.*
1860	Rumley, Major-General Randall, Vice-President Council of Military Education. 16, *Eaton-terrace, Eaton-square, S.W.*
1858	*Russell, Lord Arthur John Edward, M.P. 10, *South Audley-street, W.*
1869	Russell, George, Esq., M.A. *Viewfield, Southfields, Wandsworth; and* 16, *Old Change, St. Paul's, E.C.*
1830	*Russell, Jesse Watts, Esq., D.C.L., F.R.S.
1830	2140Russell, John, Earl, F.R.S. 37, *Chesham-place, S.W.; Pembroke-lodge, Richmond, S.W.; Endsleigh-house, Devonshire; and Gart-house, near Callander, N.B.*
1860	Russell, Wm. Howard, Esq., LL.D. *Carlton Club, S.W.*
1860	Rutherford, John, Esq. 2, *Cavendish-place, Cavendish-square, W.*
1873	Ruxton, Captain W. Fitzherbert, R.N. 41, *Cornwall-gardens, S.W.*

Year of Election.	
1857	*Ryder, Admiral Alfred P. *U. S. Club, S. W.; and Launde-abbey, Uppingham.*
1864	Ryder, G., Esq. 10, *King's-Bench-walk, Temple, E.C.*
1868	Sabben, J. T., Esq., M.D. *Northumberland-house, Stoke Newington, N.*
1873	Sabel, Ernest E., Esq. 30, *Clarendon-gardens, Maida-hill, W.*
1852	Sabine, Lieut.-General Sir Edw., K.C.B., R.A., Pres. R.S., F.R.A.S., &c. &c. 13, *Ashley-place, Victoria-street, Westminster, S. W.; and Woolwich, S.E.*
1874	St. Albans, Duke of. 4, *Prince's-gate, S.W.; and Bestwood-park, Notts.*
1869	2150St. Clair, Alexander Bower, Esq., H.B.M. Consul, Jassy, Moldavia.
1857	St. David's, Right Rev. Connop Thirlwall, Bishop of. *Abergwilly-palace, Carmarthen.*
1867	St. John, Major Oliver Beauchamp Coventry, R.E. *National Club, S. W.*
1862	St. John, Spenser, Esq., British Legation, Port-au-Prince, Haiti. *Care of J. A. St. John, Esq.*, 44, *St. John's-wood-terrace, St. John's-wood, N.W.*
1863	Sale, Lieut. M. T., R.E.
1867	Salkeld, Colonel J. C. (H.M.I. Forces). 29, *St. James's-street, S. W.*
1868	Salles, J. de, Esq. 56, *Stanhope-gardens, South Kensington, W.*
1873	Salmon, Charles Spencer, Esq. 35, *Weymouth-street, W.*
1869	*Salmond, Robert, Esq. *Reform Club, S. W.;* 14, *Woodside-crescent, Glasgow; and Rankinston, Patna, Ayr.*
1863	*Salt, Henry, Esq. *Egremont, Bournemouth.*
1861	2160Salting, William Severin, Esq. 6, *Grosvenor-gardens, S. W.*
1861	*Sandbach, Wm. Robertson, Esq. 10, *Prince's-gate, Hyde-park, S. W.*
1867	Sandeman, David George, Esq. *Cambridge-house, Piccadilly, W.*
1872	Sandhurst, General Lord, G.C.B., G.C.S.I. *Royal-hospital, Kilmainham, Dublin.*
1862	Sanford, Major Henry Ayshford. 29, *Chester-street, Grosvenor-place, S.W.; and Nynehead-court, Wellington, Somerset.*
1870	Sanford, W. Ayshford, Esq., F.R.S. 66, *Pall-mall; and Nynehead-court, Wellington, Somerset.*
1860	Sarel, Lieut.-Colonel H. A., 17th Lancers. *Army and Navy Club, S.W.; and Shanghae.*
1869	Sarll, John, Esq. *Beauvoir-house*, 34, *Englefield-road, N.*
1860	Sartoris, Alfred, Esq. *Abbottswood, Stow-on-the-Wold.*
1852	Saumarez, Captain Thomas, R.N. *The Firs, Jersey.*
1866	2170Saunders, James Ebenezer, Esq., F.L.S., F.G.S., F.R.A.S. 9, *Finsbury-circus; and Granville-park, Blackheath, S.E.*
1864	Saurin, Admiral E. *Prince's-gate, S.W.*
1863	Sawyer, Col. Charles, 6th Dragoon Guards. 25, *Queen's-gate-terrace, South Kensington, W.*
1861	Schenley, Edward W. H., Esq. 14, *Prince's-gate, S.W.*
1874	Scholfield, William F., Esq. *Belgrave-mansions, Grosvenor-gardens, S. W.*
1870	Scobell, Sandford Geo. T., Esq.
1872	Scott, Abraham, Esq. 5, *Langford-place, St. John's-wood, N.W.*

Year of Election.		
1866		Scott, Adam, Esq. 8, *Warwick-road-west, Maida-vale, W.*
1866		Scott, Arthur, Esq. *Rotherfield-park, Alton, Hants; Travellers' Club, S.W.*
1873		*Scott, Dugald, Esq. *The Moorlands, Kersal-edge, Manchester.*
1859	2180	Scott, Lord Henry. 3, *Tilney-street, Park-lane, W.*
1861		*Scott, Hercules, Esq. *Brotherton, near Montrose, N.B.*
1868		Scott, William Cumin, Esq. *Mayfield-house, Blackheath-park, S.E.*
1863		Scovell, George, Esq. 34, *Grosvenor-place, S.W.*
1873		Searight, Hugh Ford, Esq. 2, *Devonshire-villas, Surbiton.*
1861		Searight, James, Esq. 80, *Lancaster-gate, W.*
1867		Seaton, Colonel the Right Hon. Lord. *D 3, Albany, W.*
1869		Sedgwick, Jno. Bell, Esq. 1, *St. Andrew's-place, Regent's-park, N.W.*
1865		Sercombe, Edwin, Esq. 49, *Brook-street, Grosvenor-square, W.*
1858		*Serocold, Charles P., Esq. *Brewery, Liquorpond-street, E.C.*
1853	2190	Sevin, Charles, Esq. 155, *Fenchurch-street, E.C.*
1872		Sewell, Stephen A., Esq. *Reigate, Surrey.*
1867		Seymour, Alfred, Esq., M.P. 47, *Eaton-square, S.W.*
1872		*Seymour, Admiral F. Beauchamp, C.B. *Admiralty, Whitehall, S.W.*
1858		Seymour, George, Esq. 54, *Lime-street, E.C.*
1853		*Seymour, Henry Danby, Esq. *Athenæum Club, S.W.; Knoyle-house, Hindon, Wilts.*
1873		*Seymour, Colonel W. H., C.B. *United Service Club, Pall-mall, S.W.*
1854		*Shadwell, Adm. Sir Charles F. A., K.C.B., F.R.S. *Meadow-bank, Melksham, Wilts.*
1860		*Shadwell, Lieut.-Colonel Lawrence.
1856		*Share, Staff Commander James Masters, R.N. *The Willows, Wyke Regis, Weymouth, Dorset.*
1873	2200	Sharp, Captain Cyril. 7, *Thurloe-square, S.W.*
1873		*Sharp, Colin Kimber, Esq. 43, *Trejunter-road, West Brompton, S.W.*
1866		Sharp, Henry T., Esq. 102, *Piccadilly, W.*
1861		*Sharpe, William John, Esq. 1, *Victoria-street, Westminster, S.W.; and Norwood, Surrey, S.E.*
1869		Shaw, James V., Esq. *The Elms, Twickenham, S.W.*
1862		*Shaw, John, Esq. *Finegand, Otago, New Zealand. Care of John Morrison, Esq., New Zealand Government Agency, 7, Westminster-chambers, Victoria-street, S.W.*
1861		Shaw, John Ralph, Esq. *Arrowe-park, Birkenhead.*
1870		*Shaw, Robert B., Esq. (British Joint Commissioner) *Ladak, Punjab, East Indies. Care of R. P. Hicks, Esq., High-house, Kenton, near Exeter.*
1870		*Shearme, Edward, Esq. *Junior Athenæum Club, W.*
1846		Sheffield, George A. F. C., Earl of, F.R.S. 20, *Portland-place, W.; and Sheffield-park, Sussex.*
1868	2210	*Shelley, Captain G. Ernest. 32, *Chesham-place, W.*
1867		Shenstone, Fredk. Smith, Esq. *Sutton-hall, Barcombe, Lewes.*
1867		Shepherd, Chas. Wm., Esq., M.A., F.Z.S. *Trottersclife, Maidstone.*
1860		Sheridan, H. Brinsley, Esq. *New City Club, E.C.*

Year of Election.	
1863	Sheridan, Richard B., Esq., M.P. 48, *Grosvenor-place, W.*
1857	Sherrin, Joseph Samuel, Esq., LL.D., PH.DR. *Leyton-house, Leyton-crescent, Kentish-town, N.W.*
1859	*Sherwill, Lieut.-Col. W. S., F.G.S. *Perth, N.B.*
1858	*Shipley, Conway M., Esq. *Army and Navy Club, S.W.*
1868	Shirley, Lionel H., Esq., C.E., &c. *Windham Club, S.W.; and 9, Queen's-gate-terrace, S.W.*
1871	*Shoolbred, James, Esq. 38, *Lancaster-gate, Hyde-park, W.*
1873	2220Short, Robert, Esq., 42, *Hillmarten-road, Camden-road, N.*
1872	*Shuter, William, Esq. 66, *Belsize-park-gardens, Haverstock-hill, N.W.*
1856	Shuttleworth, Sir J. P. Kay, Bart. 3, *Victoria-street, S.W.; and Gawthorp-hall, Burnley, Lancashire.*
1869	Silk, George Chas., Esq. *The Vicarage, Kensington, W.*
1871	*Sills, Wm. Bernard, Esq. 19, *Beaufort-gardens, S.W.*
1870	Silva, Emanuel, Esq. 8, *Sheen-villas, Park-road, Richmond, S.W.*
1865	*Silva, Frederic, Esq. 12, *Cleveland-square, Bayswater, W.*
1859	Silver, the Rev. Fred., M.A., F.R.A.S., F.G.S., F.L.S. *Rectory, Norton-in-Hales, Market Drayton, Salop.*
1859	*Silver, Stephen Wm., Esq. 66, *Cornhill, E.C.; and 3, York-gate, Regent's-park, N.W.*
1860	Sim, John Coysgame, Esq. *Coombe-wood, Kingston, Surrey.*
1853	2230Simmons, Edward R., Esq., Barrister-at-Law. *Nevill-house, Belgrave-terrace, Brighton.*
1848	*Simmons, Lieut.-General Sir John L. A., R.E., K.C.B. *Lieut.-Governor Royal Military Academy, Woolwich, S.E.*
1866	Simons, Henry M., Esq. *Tyersall-crescent, Wood-road, Sydenham-hill, S.E.*
1864	Simpson, Frank, Esq. 17, *Whitehall-place, S.W.*
1862	Simpson, Henry Bridgeman, Esq. 44, *Upper Grosvenor-street, W.*
1863	*Simpson, William, Esq. 64, *Lincoln's-inn-fields, W.C.*
1866	*Sims, Richard Proctor, Esq., C.E. *Malabar-hill, Bombay. Care of Messrs. H. S. King and Co.*
1858	Skelmersdale, Edward, Lord. *Lathom-park, Ormskirk, Lancashire.*
1872	Skilbeck, A. Jos., Esq. 202, *Upper Thames-street, E.C.*
1873	Skilbeck, Jno. Hy., Esq. *St. James's-lodge, Clapton.*
1866	2240Skinner, John E. H., Esq. 3, *Dr. Johnson's-buildings, Temple, E.C.*
1863	Skrine, Henry D., Esq. *Warleigh-manor, near Bath.*
1871	Slade, Henry, Esq., Staff-Surgeon, R.N. *Army and Navy Club, S.W.; and Royal Western Yacht Club, Plymouth.*
1870	Sladen, Major E. B. (Polit. Agent at the Court of H.M. the King of Burmah). *Care of Messrs. Grindlay and Co., 55, Parliament-street, S.W.*
1861	Sladen, Rev. Edward Henry Mainwaring. *The Gore, Bournemouth.*
1872	Smale, John, Esq. Chief Justice, Hong-Kong. *Care of Clements Smale, Esq., 46, York-terrace, Regent's-park, N.W.*
1865	Smedley, Joseph V., Esq., M.A. *Oxford and Cambridge Club, S.W.*
1871	Smetham, John Osborne, Esq. *King's Lynn, Norfolk.*

Year of Election.	
1860	*Smith, Augustus Henry, Esq. *Flexford-house, Guildford.*
1871	Smith, Major C. B. Euan. 14, *St. James's-square, S.W. Care of King and Co., Cornhill, E.C.*
1866	2250Smith, Drummond Spencer-, Esq. 7, *Mount-street, Berkeley-square, W.*
1859	Smith, Edward, Esq. *Windham Club, S.W.*
1871	Smith, Geo. Fereday, Esq., M.A., J.P., &c. *Grovehurst, Tunbridge-wells.*
1873	Smith, Griffiths, Esq. *The Grove, Highgate, N.*
1865	Smith, Guildford, Esq. 63, *Charing-cross, S.W.*
1861	Smith, Jervoise, Esq. 47, *Belgrave-square, S.W.*
1853	Smith, John Henry, Esq. 1, *Lombard-st., E.C.; and Purley, Croydon, Surrey.*
1861	*Smith, Joseph Travers, Esq. 25, *Throgmorton-street, E.C.*
1857	Smith, Captain Philip, Grenadier Guards.
1873	Smith, Dr. Porter, M.D. *Shepton Mallet, Somersetshire.*
1868	2260*Smith, Major Robert M., R.E., Director of the Telegraphic Establishment in Persia. *Teheran.*
1874	Smith, Rupert, Esq. *Hart's-hill-cottage, Brierley-hill, Stafford; and The Priory, Dudley.*
1841	*Smith, Thomas, Esq.
1859	*Smith, W. Castle, Esq. 1, *Gloucester-terrace, Regent's-park, N.W.*
1857	Smith, Wm. Gregory, Esq. *Hudson-bay Company, 1, Lime-street, E.C.*
1859	Smith, William Henry, Esq., M.P. 1, *Hyde-park-street, W.*
1857	*Smith-Bosanquet, Horace, Esq. *Broxbourne-bury, Hoddesdon.*
1869	Smyth, Colonel Edmund. *Welton-le-Wold, South Lincolnshire.*
1869	*Smyth, Warington, Esq., F.R.S. 92, *Inverness-terrace, W.*
1837	*Smyth, Rear-Admiral William. *Care of Messrs. Child and Co., Temple-bar.*
1850	2270*Smythe, Major-General William J., R.A., F.R.S.
1872	Snooke, William, Esq. 20, *Northampton-park, Canonbury, N.*
1865	*Solomons, Hon. George. *Jamaica.*
1839	*Somers, Charles, Earl. 33, *Prince's-gate, S.W.; Eastnor-castle, Herefordshire; and The Priory, Reigate, Surrey.*
1862	Somerset, Capt. Leveson E. H., R.N. *Care of Messrs. Chard, 3, Clifford's-inn, Fleet-street, E.C.*
1855	Sopwith, Thos., Esq., M.A., C.E., F.R.S. 103, *Victoria-street, Westminster, S.W.*
1860	Southesk, The Right Hon. James Carnegie, Earl of. *Kinnaird Castle, Brechin, N.B.*
1860	*Southey, James Lowther, Esq. *Care of Messrs. Stilwell, Arundel-street, Strand.*
1869	Southwell, Thomas Arthur Joseph, Viscount. *Windham Club, S.W.*
1872	Spalding, Captain H., 104th Regiment. *Naval and Military Club, Piccadilly.*
1865	2280Spalding, Samuel, Esq. *Thornleigh, Sydenham-hill, S.E.*
1870	Sparks, J. Hyde, Esq. *Conservative Club, S.W.*
1874	Sparrow, William, Esq. *Albrighton-hall, Shrewsbury.*
1873	Spence, Jas. Mudie, Esq. *Erlington-house, Whalley-range, Manchester.*
1873	Spence, Jno. Berger, Esq., F.G.S., &c. *Erlington-hall, Whalley-range, Manchester.*
1870	Spencer, Admiral the Hon. J. W. S. 5, *Portman-street, W.*

Year of Election.	
1874	Spencer, Walter, Esq. 26, *Great Queen-street, Bloomsbury; and Cavendish Club*, 307, *Regent-street, W.*
1867	Spicer, Edward, Esq. 19, *New Bridge-street, E.C.*
1863	Spickernell, Dr. Geo. E., Principal of Eastman's Royal Naval Establishment. *Eastern-parade, Southsea.*
1855	*Spottiswoode, William, Esq., F.R.S. 50, *Grosvenor-place, S.W.*
1859	2290*Spratt, Rear-Admiral Thos. A. B., C.B., F.R.S. *Clare-lodge, Nevill-park, Tunbridge-wells, Kent.*
1866	Spruce, Richard, Esq., PH.DR. *Welburn, Castle Howard, York.*
1871	Square, William, Esq., F.R.C.S. 22, *Portland-square, Plymouth.*
1859	Stafford, Edward W., Esq. Colonial Secretary of New Zealand. *Care of Mr. J. S. Tytler*, 19, *Castle-street, Edinburgh.*
1853	Stanford, Edward, Esq. 6, *Charing-cross, S.W.*
1855	Stanhope, Philip Henry, Earl, Pres. Soc. of Antiquaries, F.R.S. 3, *Grosvenor-place-houses, Grosvenor-place, S.W.; and Chevening, Sevenoaks, Kent.*
1860	*Stanhope, Walter Spencer, Esq. *Cannon-hall, Barnsley, Yorkshire.*
1870	Stanley, Lieut. Henry, R.N. *Admiralty Survey, Melbourne. Care of Captain J. E. Davis*, R.N.
1872	*Stanley Walmsley, Esq., C.E. *Care of Messrs. Cutbill, Son, and Delungo*, 103, *Cannon-street, E.C.*
1869	Stanton, Charles Holbrow, Esq. 1, *Mitre-court-buildings, Inner Temple, E.C.*
1863	2300Stanton, George, Esq. *Coton-hill, Shrewsbury; and Conservative Club, S.W.*
1867	Stanton, Henry, Esq. 1, *River-street, Myddelton-square, W.C.*
1871	Stark, Wm. Emery, Esq. *Chancellor-villa, Park-road, West Dulwich, S.E.*
1870	Starling, Joseph, Esq. *Boresford-lodge, Dyke-road, Brighton.*
1856	Statham, John Lee, Esq. 60, *Wimpole-street, W.*
1868	Staveley, Major-Gen. Sir Charles, K.C.B. *Government-house, Devonport; and United Service Club, S.W.*
1869	*Staveley, Miles, Esq. *Old Sleningford-hall, Ripon.*
1863	Stebbing, Edward Charles, Esq. *National Debt Office*, 19, *Old Jewry, E.C.; and The Aspens, Sunbury.*
1867	Steel, Capt. J. P., R.E. *Junior United Service Club, S.W. Care of Messrs. Grindlay and Co.*, 55, *Parliament-street, S.W.*
1868	Steel, William Strang, Esq. *Care of Messrs. Houstoun, Steel, and Co.*, 3, *East India-avenue, E.C.*
1871	2310Stein, Hon. Robert. *Port Louis, Mauritius. Care of Robt. McKerrell, Esq.*, 45, *Inverness-terrace, W.*
1870	Stenning, Charles, Esq. 3, *Upper Hamilton-terrace, N.W.*
1872	Stephani, Albert, Esq. (Kt. of Bederkesa), LL.D., PH.D., Secretary to Chamber of Commerce and Industry for Silesia. *Troppau, Silesia. Care of the Austro-Hungarian Consulate*, 29, *St. Swithin's-lane, E.C.*
1850	*Stephen, Sir George. *Melbourne. Care of Mr. H. W. Ravenscroft*, 7, *Gray's-inn-square, W.C.*
1870	*Stephens, Thomas Wall, Esq. *North-villa, Regent's-park, N.W.*
1869	Stephenson, B. Charles, Esq. 12, *Bolton-row, Mayfair, W.*

Year of Election.	
1868	Stephenson, Henry P., Esq. 8, *St. Mary-axe, E.C.*
1857	Stephenson, Sir R. Macdonald, C.E. 72, *Lancaster-gate, W.; and East-cottage, Worthing.*
1866	Stepney, A. K. Cowell, Esq. 6, *St. George's-place, Knightsbridge, S.W.*
1869	Steuart, Colonel T. R., Bombay Army. *Esgair, Machynlleth, Wales.*
1874	2320Stevens, George Richard, Esq. 12, *Abingdon-villas, Kensington, W.*
1855	Stevens, Henry, Esq., F.S.A. 4, *Trafalgar-square, W.C.*
1841	Stevenson, Thomas, Esq., F.S.A. *Iver Heath, Bucks.*
1873	Stewart, A. J. R., Esq. 34, *Wimpole-street, W.; and Ards-house, Co. Donegal.*
1869	Stewart, Capt. C. E., R.A. (Bengal Staff Corps). 14, *Sussex-gdns., Hyde-park, W.*
1874	Stewart, Gilbert McLeod, Esq. 1, *Westminster-chambers, S.W.*
1871	*Stewart, Captain Herbert, 3rd Dragoon Guards. *Norwich.*
1866	Stewart, Rev. Dr. James. *Lovedale, Alice, South Africa. Care of Robert Young, Esq., Offices of the Free Church of Scotland, Edinburgh.*
1860	*Stewart, Major J. H. M. Shaw, Royal Madras Engineers.
1869	Stewart, J. L., Esq., M.D., Forest Department, India.
1872	2330Stewart, Wm., Esq., M.D. *Care of R. Watson, Esq.*, 32, *Inverness-terrace, Bayswater, W.*
1873	Stewart, Admiral Wm. Houston, C.B. 53, *Warwick-square, S.W., and Admiralty, S.W.*
1870	Stilwell, Henry, Esq., M.D. *Moarcroft, Hillington, Uxbridge.*
1860	Stirling, Capt. Frederick H., R.N. *H.M.S. 'Hero;' and United Service Club, S.W.*
1863	Stirling, Sir Walter, Bart. 36, *Portman-square, W.*
1868	Stock, Thomas Osborne, Esq. 44, *Eastbourne-terrace, W.*
1860	Stocker, John Palmer, Esq. 93, *Oxford-terrace, Hyde-park, W.*
1845	*Stokes, Rear-Admiral John Lort. *United Service Club, S.W.; and Scotchwell, Haverfordwest, Wales.*
1868	Stone, David H., Esq., Alderman. *Sydenham-hill, S.E.*
1867	*Story, Edwin, Esq., M.A.
1868	2340Stovin, Rev. Charles F. 59, *Warwick-square, S.W.*
1866	Strachey, Major-General Richard, R.E., C.S.I., F.R.S. *India-office, S.W.*
1861	Strange, Lieut.-Col. Alexander, F.R.S. *India Store Department, Belvedere-road, Lambeth, S.E.*
1858	Stratford de Redcliffe, Stratford Canning, Viscount. 29, *Grosvenor-square, W.*
1864	Straton, Rev. N. D. J. *Kirkby-wharf, Tadcaster.*
1873	Straughton, Joseph, Esq. *Cockermouth, Cumberland.*
1860	Strickland, Edward, Esq., C.B., Commissary-General. *Care of Sir Chas. R. M'Grigor, Bart., & Co.*, 25, *Charles-street, St. James's-square, S.W.*
1868	*Strode, Alf. Rowland Chetham, Esq. *Dunedin, Otago, New Zealand. Care of J. G. Cooke, Esq.*
1865	Strong, F. K., Esq., K.H. *Hamburg, Germany. Care of Alfred Strong, Esq., Junior Athenæum Club, Piccadilly, W.*
1853	Stronsberg, Dr. Bethel Henry. 5, *Grosvenor-place, S.W.*
1853	2350Strutt, George H., Esq., F.R.A.S. *Bridge-hill, Belper.*

Year of Election.	
1858	Strutt, Captain Hammel Ingold, F.R.A.S. *Royal Mail Steam Packet Company, Southampton.*
1873	Stuart, Lieut.-Gen. Charles. 5, *Granville-place, Portman-square, W.*
1859	Stuart, Lieut.-Col. J. F. D. Crichton. 25, *Wilton-crescent, Belgrave-sq., S.W.*
1861	Stuart, Right Hon. Sir John. *Loch Carron, Ross-shire; and* 5, *Queen's-gate, Hyde-park, W.*
1866	Stuart, Major Robert. *Janina, Albania.*
1873	Sturgeon, Wentworth, Esq. 3A *Cleveland-row, St. James's, S.W.*
1872	Sturt, Henry, Esq., jun. 27, *Gordon-square, W.C.*
1872	Styan, Arthur, Esq., F.S.A. 28, *Norfolk-crescent, Hyde-park, W.*
1858	Sudeley, Charles G. Hanbury Tracy, Lord. 5, *Bolton-row, W.; and Toddington, near Broadway, Worcester.*
1857	2360 Sulivan, Rear-Admiral Sir Bartholomew J., R.N., K.C.B. *Bournemouth.*
1865	Sullivan, Captain T. W., C.B., R.N.
1869	Summerhayes, William, Esq., M.D. *Upper St. Giles's, Norwich.*
1862	Surridge, Rev. Henry Arthur Dillon, M.A. 21, *Berners-street, W.*
1862	Surtees, Colonel Charles Freville. *Chalcott-house, Long Ditton, Surrey.*
1873	Sutherland, Geo., Esq. *Rose-hill, Derby.*
1861	*Sutherland, George Granville William, Duke of, F.R.S. *Stafford-house, St. James's-palace, S.W.*
1869	Sutherland, Robert, Esq. *Egham-rise, Surrey.*
1869	Sutherland, Thomas, Esq. 38, *Thurloe-square, S.W.*
1871	Sutton, W. P., Esq., LL.D., F.S.A., &c. *Collegiate School,* 45, *Emma-place, Stonehouse, Plymouth.*
1871	2370 Swan, Major Percival. 114, *Piccadilly, W.*
1857	Swanzy, Andrew, Esq. *Sevenoaks, Kent.*
1836	*Swinburne, Rear-Admiral Charles H. *Holmewood, Henley-on-Thames.*
1862	*Swinburne, Commr. Sir John, Bart., R.N. *Capheaton, Newcastle-on-Tyne.*
1863	Swinhoe, R., Esq., H.B.M. Consul, Taiwan. 33, *Carlyle-square, S.W.*
1871	Syme, Henry, Esq. 60, *Palace-gardens-terrace, Campden-hill, W.*
1864	Symonds, F., Esq., M.D. *Beaumont-street, Oxford.*
1852	*Synge, Colonel Millington H., R.E. *Alvercliff, Alverstoke, Hants.*
1852	Tagart, Courtenay, Esq. *Rocklenze Point, Durdham Down, near Bristol.*
1859	Tagart, Francis, Esq. 31, *Craven-hill-gardens, Hyde-park, W.*
1866	2380 Taintor, Edward C., Esq. (Imperial Chinese Customs). *China. Care of H. C. Batchelor, Esq.,* 2, *King William-street, E.C.*
1857	*Tait, Robert, Esq. 14, *Queen Anne-street, W.*
1861	Talbot de Malahide, James Talbot, Lord, F.R.S. *Malahide Castle, Co. Dublin.*
1861	Taylor, Commander A. Dundas, I.N. 6, *Lawn-terrace, Blackheath, S.E.*
1873	Taylor, Charles, Esq. *Church-house-school, Ealing, W.*
1869	Taylor, George N., Esq. *National Bank, Old Broad-street, E.C.*
1865	Taylor, H. L., Esq. *Reform Club, S.W.; and* 23, *Phillimore-gardens, Kensington, W.*

Year of Election.	
1873	Taylor, Jas. Banks, Esq. *Thatched-house Club, St. James's, S.W.*
1865	Taylor, Rev. Jas. Hudson. 6, *Pyrland-road, Newington-green, N.*
1871	*Taylor, John, Esq. *The Rocks, Bath; and Booth-hall, Blackley, Lancashire.*
1863	2390 Taylor, John, Esq. *Grena-lodge, Richmond.*
1870	*Taylor, John Fenton, Esq. 20, *New-street, Spring-gardens, S.W.*
1867	*Taylor, John George, Esq. H.B.M. Consul in Kurdistan, Diarbekir. *Care of Messrs. O'Brien and Co.*, 43, *Parliament-street, S.W.*
1854	*Taylor, John Stopford, Esq., M.D. 1, *Springfield, St. Anne-street, Liverpool.*
1863	Taylor, Maj.-Gen. R.C.H., C.B. 16, *Eaton-place, S.W.; and Carlton Club, S.W.*
1873	Taylor, Wm. Richard, Esq., Deputy-Commissary. *Fort George, Invernesshire.*
1865	Teede, Chas., Esq. 12, *Granville-park, Blackheath.*
1864	Temple, Sir Richard, K.C.S.I.
1860	Templeton, John, Esq. 24, *Budge-row, E.C.*
1857	Tennant, Professor James. 149, *Strand, W.C.*
1872	2400 Terrero, Maximo, Esq. (Consul-General for Republic of Paraguay.) 88, *Belsize-park-gardens, N.W.*
1870	Teschemacher, Edward Fred., Esq. 1, *Highbury-park-north, N.*
1830	*Thatcher, Colonel E.I.C.
1863	Thomas, G., Esq.
1854	Thomas, Henry Harrington, Esq. 8, *Camden-crescent, Bath.*
1872	Thomas, James Lewis, Esq., War-office, Horse Guards. 26, *Gloucester-street, Warwick-square, S.W.; and Thatched House Club, St. James's-street, S.W.*
1865	Thomas, John Henwood, Esq. *East India Dept., Custom-house, E.C.*
1864	Thomas, J. R., Esq., Staff Assist. Surg. *Castle-hill, Fishguard, Pembrokeshire.*
1874	Thomas, R. Gerard de V., Esq., M.A. *Eyhorne-house, Maidstone; and Universities Club, Jermyn-street, S.W.*
1869	Thompson, Lieut.-Col. George, C.E., Cordoba, Argentine Confederation. *Care of Messrs. Parlane, Graham, and Co., Buenos Ayres; Messrs. Lumb, Wanklyn, and Co.*, 10, *Angel-court, Throgmorton-street, E.C.*
1869	2410 *Thompson, Henry Yates, Esq. 32, *Ennismore-gardens, S.W.*
1872	Thompson, Lieut. Richard, R.E. *R. E. Office, Colchester.*
1863	Thomson, James, Esq. *Dunstable-house, Richmond.*
1863	Thomson, James Duncan, Esq., Portuguese Consul. *St. Peter's-chambers, Cornhill, E.C.*
1848	*Thomson, J. Turnbull, Esq., Chief Surveyor. *Otago, New Zealand.*
1866	Thomson, John, Esq. 42, *Burton-road, Brixton-road, S.W.*
1861	*Thomson, Ronald Ferguson, Esq., 1st Attaché to the Persian Mission.
1854	*Thomson, Thomas, Esq., M.D., F.R.S. *The Cottage, W. Farleigh, Maidstone.*
1865	Thomson, W. T., Esq.
1862	*Thorne, Augustus, Esq. 4, *Cullum-street, City, E.C.*
1867	2420 Thornton, Edward, Esq., C.B. *Harrow.*
1847	Thornton, Rev. Thomas Cooke, M.A., M.R.I. *Brock-hall, near Weedon, Northamptonshire.*
1858	Thorold, Rev. A. W. 31, *Gordon-square, W.C.*

Year of Election.	
1868	Thorold, Alexander W. T. Grant, Esq. *Melsley, Great Grimsby, Lincolnshire.*
1871	Thorpe, Wm. Geo., Esq., F.G.S. *Gloucester-house, Larkhall-rise, S.W.; and Barton's-house, Ipplepen, Newton Abbot, Devon.*
1859	Thuillier, Colonel H. L., C.S.I., Surveyor-General of India, F.R.S. *Calcutta. Care of Messrs. Grindlay and Co., 55, Parliament-street.*
1872	Thuillier, Capt. Hy. R., R.E. *King and Co., Pall-mall.*
1865	*Thurburn, C. A., Esq. 16, *Kensington-park-gardens, Notting-hill, W.*
1864	*Thurburn, Hugh, Esq. 103, *Westbourne-terrace, W.*
1861	Thurlow, The Hon. Thos. J. Hovell. *Dumphail, Torres, N.B.*
1874	2430Tighe, Colonel Frederick. *Rossana, Ashford, County Wicklow; and Travellers' Club, Pall-mall, S.W.*
1868	Tilley, Henry Arthur, Esq. *Hanwell, Middlesex, W.*
1873	*Tindale, Thomas P., Esq. *Woldingfold, Sussex; and Everly, Lincolnshire; Conservative, Raleigh, and Junior Carlton Clubs, S.W.*
1872	Tinline, George, Esq. 17, *Prince's-square, Bayswater, W.*
1839	*Tinne, John A., Esq. *Briarley, Aigburth, near Liverpool.*
1873	Tipping, George B., Esq. *Coombe-lodge, Kingston-hill, Surrey.*
1862	Todd, John, Esq. *Eastcote-lodge, St. John's-park, Blackheath, S.E.*
1865	Todd, Rev. John W. *Tudor-hall, Forest-hill, Sydenham, S.*
1853	*Tomlin, George Taddy, Esq., F.S.A. *Combe-house, Bartonfields, Canterbury.*
1853	Tomline, George, Esq. 1, *Carlton-house-terrace, S.W.*
1873	2440Tomlinson, John, Esq. *St. Peter's-college, Peterborough.*
1856	Torrance, John, Esq. 5, *Chester-place, Hyde-park-square, W.*
1866	Torrens, Sir Robert Richard, K.C.M.G. 2, *Gloucester-place, Hyde-park, W.; and The Cott, Holm, near Ashburton, South Devon.*
1859	Townshend, Commander John, R.N. *Lona, Weston-super-Mare.*
1866	Townson, Wm. Parker, Esq., B.A. Cantab. *Care of Miss Townson, Ash-house, Caton, near Lancaster.*
1846	*Towry, George Edward, Esq.
1873	Towse, John Wrench, Esq. *Fishmongers'-hall, London-bridge, E.C.*
1858	Towson, J. Thomas, Esq. *Secretary Local Marine Board, Liverpool.*
1864	*Toynbee, Capt. Henry. 12, *Upper Westbourne-terrace, W.*
1863	*Tozer, Rev. H. F., M.A. *Exeter College, Oxford.*
1864	2450Tracy, The Hon. C. H. 11, *George's-street, W.*
1863	*Travers, Arch., Esq. 28A, *Addison-road, Kensington, W.*
1867	Tremenheere, Major-General C. W., C.B., R.E. 1, *Porchester-square, Bayswater.*
1859	Tremlett, Rev. Francis W., M.A., D.C.L., DR. PH. *Belsize-park, Hampstead, N.W.*
1869	Trench, Captain Frederic. *Naval and Military Club, Piccadilly, W.*
1865	*Trench, Major the Hon. Le Poer, R.E. 32, *Hyde-park-gardens, W.; and Ordnance-survey-office, Pimlico, S.W.*
1863	Trestrail, Rev. Frederick. *St. John's-road, Newport, Isle of Wight.*
1862	Trevelyan, Sir Charles Edward, Bart., K.C.B. 8, *Grosvenor-crescent, S.W.*

Year of Election.	
1830	Trevelyan, Sir Walter Calverly, Bart., M.A., F.S.A., F.L.S., F.R.S.N.A., &c. *Athenæum Club, S.W.; Wallington, Northumberland; and Nettlecombe, Somerset.*
1864	Trimmer, Edmund, Esq. *Care of Messrs. Trimmer and Co., New City-chambers, Bishopsgate-street, E.C.*
1867	2460 Tritton, Joseph Herbert, Esq. 54, *Lombard-street, E.C.*
1871	Trivett, Captain John Fredk., R.N.R. *The Homestead, Hackney-common, N.E.*
1869	Trotter, Capt. Henry, R.E. *Care of Messrs. Richardson, 23, Cornhill, E.C.*
1872	Trotter, Captain J. Moubray. *Naval and Military Club, Piccadilly, W.*
1872	Treuenfeld, Richard von F., Esq. 3, *Great George-street, Westminster.*
1870	Trutch, J. W., Esq. (Chief Commissioner of Lands and Works). *British Columbia.*
1867	Tryon, Captain George, R.N., C.B. *Army and Navy Club, S.W.*
1862	Tuckett, Francis Fox, Esq. *Frenchay, near Bristol.*
1835	*Tuckett, Frederick, Esq. 4, *Mortimer-street, Cavendish-square, W.*
1865	Tuckett, Philip D., Esq. 28, *Cleveland-gardens, Hyde-park, W.*
1852	2470 Tudor, Edward Owen, Esq., F.S.A. 1, *Portugal-street, Grosvenor-square, W.*
1857	Tudor, Henry, Esq. 12, *Portland-place, W.*
1864	Turnbull, George, Esq., C.E., F.R.A.S. 23, *Cornwall-gardens, South Kensington, W.*
1834	*Turnbull, Rev. Thomas Smith, F.R.S. *University Club, S.W.; and Blofield, Norfolk.*
1873	Turner, Hon. George. 7, *Brook-street, Hanover-square, W.*
1870	Turner, Major-General Henry Blois, Bomb. Eng. 131, *Harley-street, W.*
1863	Turner, Thomas, Esq. *Guy's-hospital, Southwark, S.E.*
1867	Tweedie, Captain Michael, R.A. *Woolwich.*
1864	*Tweutyman, A. C., Esq. *Tettenhall-wood, near Wolverhampton.*
1863	Twentyman, William H., Esq. *Ravensworth, St. John's-wood-park, N.W.*
1863	2480 *Twiselton, Hon. E. F. *Rutland-gate, S.W.*
1849	Twiss, Sir Travers, D.C.L., F.R.S. 3, *Paper-buildings, Temple, E.C.*
1858	Twyford, Captain A. W., 21st Hussars. *Resident Commissioner, H. M.'s Convict Prisons, British Guiana. Care of A. J. Murray, Esq., 7, Whitehall-place, S.W.; and Reform Club, S.W.*
1865	Tyer, Edward, Esq., C.E., F.R.A.S. 15, *Old Jewry-chambers, E.C.*
1862	*Tyler, George, Esq. 24, *Holloway-place, Holloway-road, N.*
1873	Tyler, W. James, Esq. *West-hill, Sydenham, Kent.*
1859	Tytler, Colonel W. Fraser. *Aldowrie, Inverness.*
1869	Underdown, E. M. Esq., 3, *King's-Bench-walk, Temple, E.C.*
1862	Underhill, Edward Bean, Esq., LL.D. *Derwent-lodge, Thurlow-road, Hampstead, N.W.*
1868	Unwin, Howard, Esq., C.E. 24, *Bucklersbury, E.C.*
1861	2490 Ussher, John, Esq. *Arthur's Club, St. James's-street, S.W.*
1844	*Vacher, George, Esq. *Manor-house, Teddington.*
1874	Valentine, William J., Esq. *Homedale-house, Gypsy-hill, Upper Norwood; and 18, Cornhill, E.C.*

Year of Election.	
1872	*Vallentin, James R., Esq. 55, *Cow-cross, E.C.*
1862	*Vander Byl, P. G., Esq. 126, *Harley-street, W.*
1865	Vane, G., Esq. *Ceylon. Messrs. Price and Boustead, Craven-st., Strand, W.C.*
1856	*Vaughan, James, Esq., F.R.C.S. *Builth, Breconshire.*
1852	*Vavasour, Sir Henry M., Bart. *Dane End, Ware, Herts.*
1855	Vavasseur, James, Esq. *Knockholt, near Sevenoaks, Kent.*
1866	Venner, Captain Francis John S. *Dulston-house, Upper Norwood, S.E.; and Elmbank, near Worcester.*
1871	2500Vereker, Lieut.-Col. the Hon. Chas. Smyth. *The Avenue, Beulah-hill, S.E.*
1863	*Vereker, The Hon. H. P., LL.D., H.M. Consul at Charante. 1, *Portman-square, W.*
1862	Verner, Edward Wingfield, Esq., M.P. *The Aske, Bray, Ireland.*
1862	*Verney, Commr. Edmond H., R.N. 32, *South-street, Grosvenor-square, W.*
1837	*Verney, Major Sir Harry C., Bart., F.R.A.S. *Travellers' Club, S.W.; and* 32, *South-street, W.*
1857	Verrey, Charles, Esq.
1852	Verulam, James Walter, Earl of. *Gorhambury, near St. Alban's; Barry-hill, Surrey; and Messing-hall, Essex.*
1865	Vile, Thomas, Esq. 75, *Oxford-terrace, W.*
1865	*Vincent, M. C., Esq., Professor of Economic Geology and Metallurgy; Inspector of Mines, &c. *Cincinnati, U.S.; and* 127, *Strand, London.*
1873	Vincent, Lieut. Charles Edward Howard. *Royal United Service Institution, Whitehall-yard, S.W.*
1857	2510Vincent, John, Esq. 7, *Granville-park, Blackheath, S.E.*
1871	Vine, Lieut. Wm. W., R.N. *Ivanhoe-villa, Waverley-road, Southsea.*
1858	Vines, William Reynolds, Esq., F.R.A.S. *Care of Sydney H. Vines, Esq., Guy's hospital, E.C.; and* 4, *Thavies-inn, Holborn-hill, E.C.*
1872	Vivian, Hon. H. Crespigny. *Foreign-office, S.W.*
1863	Vivian, Major Quintus. 17, *Chesham-street, Belgrave-square, S.W.*
1863	*Vyvyan, Sir Richard Rawlinson, Bart., F.R.S. *Trelowarren, Cornwall.*
1864	Wade, R. B., Esq. 13, *Seymour-street, Portman-square, W.*
1873	Wade, Thos. F., Esq., C.B., H.B.M. Secretary of Legation. *Pekin, China.*
1873	*Wagner, Henry, Esq., M.A. 16, *King-street, St. James's, S.W.*
1853	*Wagstaff, William Racster, Esq., M.D., M.A.
1869	2520Waite, Charles, Esq., LL.D., Principal of St. John's College. *Weighton-road, South Penge-park, S.E.*
1863	Waite, Henry, Esq. 3, *Victoria-street, Pimlico, S.W.*
1867	*Waite, Rev. John.
1871	Wakley, Thos. Finsbury Septimus, Esq., C.E. *College-terrace, Guernsey.*
1873	*Walford, Lionel N., Esq. 66, *Lowndes-square, S.W.*
1870	*Walker, Albert, Esq. *Auckland Club, New Zealand. Care of L. C. Walker, Esq., 3. Hartley-villas, Lansdowne-road, Croydon.*

Year of Election.	
1862	Walker, Major-General C. P. Beauchamp, C.B. 2, *Cranley-place, Onslow-square, S. W.; and United Service Club, S. W.*
1872	Walker, Capt. Campbell (Mad. Staff Corps). 17, *Lansdowne-road, Notting-hill, W.; and The Grange, Alnmouth, Northumberland.*
1861	Walker, Edward Henry, Esq., Consul at Cagliari. *Care of Messrs. Drummond.*
1863	*Walker, Frederick John, Esq. *The Priory, Bathwick, Bath.*
1859	2530*Walker, Colonel James T., F.R.S., Royal Engineers. Supt. Gt. Trig. Survey of India. *Dehra Doon, India. Care of Messrs. H. S. King and Co., Pall-mall, S.W.; and* 17, *Queensberry-place, Cornwall-road, South Kensington, S.W.*
1873	Walker, John, Esq. 15, *Loughborough-road, North Brixton.*
1861	*Walker, John, Esq.
1858	*Walker, Captain John, H.M.'s 66th Foot. *Broom-hill, Colchester.*
1871	*Walker, Capt. J. B. *East Bank, Oxton, Birkenhead; and Old Calabar, near Bonny, West Africa.*
1864	Walker, R. B. N., Esq. *Care of Mr. Blissett,* 38, *South Castle-street, Liverpool.*
1863	*Walker, T. F. W., Esq. 6, *Brock-street, Bath; and Athenæum Club, S.W.*
1861	Walker, Rev. William. *Grammar-school, Hanley-castle, Upton-on-Severn.*
1866	Walker, William, Esq., F.S.A. 48, *Hilldrop-road, Tufnell-park, N.*
1868	Walkinshaw, William, Esq. *Hartley-grange, Winchfield, Hants.*
1854	2540*Wallace, Alfred Russell, Esq. *The Dell, Grays, Essex.*
1861	Wallace, Rev. Charles Hill, M.A. 3, *Harley-place, Clifton, Bristol.*
1872	Waller, Edmund, Esq. *Hoe-street, Walthamstow, E.*
1864	Waller, Rev. Horace. *The Vicarage, Leytonstone.*
1863	Wallich, George C., Esq., M.D. *Terrace-house, St. George's-terrace, Herne-bay.*
1872	*Wallroth, Chas. Henry, Esq. *Woodclyffe, Chislehurst.*
1860	Walpole, Capt. the Hon. F., M.P. 14, *Dean-street, Park-lane, W.; and Rainthorpe-hall, Long Stratton, Norfolk.*
1863	Walpole, Rt. Hon. Spencer, M.P., F.R.S. 109, *Eaton-square, S.W.*
1853	Walter, Henry Fraser, Esq. *Papplewick-hall, near Nottingham.*
1873	*Waltham, Edward, Esq. *Watcombe-house, Stockwell-green, S.W.*
1863	2550Walton, J. W., Esq. 26, *Savile-row, W.*
1864	Walton, R. G., Esq., C.E. *Bombay.*
1874	Ward, Edwin, Esq., F.Z.S. *York-house,* 69, *Avenue-road, St. John's-wood, N.W.*
1853	*Ward, George, Esq.
1860	Ward, Admiral J. Hamilton. *Oakfield, Wimbledon-park, S.W.*
1868	Ward, Captain the Hon. Wm. John, R.N. *H.M. Legation, Washington. Care of Messrs. Chard,* 3, *Clifford's Inn, E.C.*
1869	Ward, William Robert, Esq. *Nea-house, Christchurch, Hants.*
1862	Wardlaw, John, Esq. 44, *Prince's-gardens, Hyde-park, S.W.*
1868	Wardlaw, Major-General Robert, C.B. *United Service Club, S.W.*
1864	Warner, E., Esq. 49, *Grosvenor-place, S.W.*
1859	2560Warre, Arthur B., Esq. 109, *Onslow-square, S.W.*
1872	Warre, Rev. Edmond, M.A. *Eton College.*

Year of Election.		
1869		Warre, Major-General H. J., C.B. *United Service Club, S.W.*
1869		Warren, Charles, Esq. 17, *Hanover-street, Peckham, S.E.*
1862		Warren, Captain Richard Pelham. *Worting-house, Basingstoke.*
1867		Waterhouse, George Marsden, Esq. *Care of Messrs. Morrison and Co.*, 4, *Fenchurch-street, E.C.*
1874		Waters, T., Esq., Surveyor-General to the Japanese Government. *Care of Albert Robinson, Esq.*, 30, *Apsley-road, Clifton, Bristol.*
1871		Wates, Edward, Esq. *Glenthorne*, 15, *Harmer-street, Gravesend.*
1852		Watkins, John, Esq., F.R.C.S., F.S.A.
1862		Watney, John, Esq. 16, *London-street, Fenchurch-street, E.C.*
1859	2570	Watson, James, Esq. 24, *Endsleigh-street, W.C.*
1860		Watson, James, Esq., Barrister-at-Law. *Langley-house, Langley, Bucks.*
1861		Watson, John Harrison, Esq. 28, *Queensborough-terrace, Kensington-gardens, W.*
1868		Watson, Robert, Esq. 32, *Inverness-road, Bayswater, W.*
1872		Watson, Robert, Esq. *Fulcott-house, North-hill, Highgate, N.*
1867		Watson, Robert Spence, Esq. *Moss Croft, Gateshead-on-Tyne.*
1870		Watson, Thos., Esq., Portuguese Vice-Consul, Cape Town. *Care of J. R. Thomson and Co., St. Peter's-chambers, E.C.*
1868		Watson, Wm. Bryce, Esq. 5, *Lime-street-square, E.C.; and* 29, *Duke-street, St. James's, S.W.*
1871		Watt, Robert, Esq., C.E. *Ashley-avenue, Belfast.*
1872		Watts, H. Cecil, Esq. 15, *Randolph-road, Maida-hill, W.*
1872	2580	Watts, John, Esq. *Over Court, near Bristol.*
1857		*Waugh, Maj.-General Sir Andrew Scott, Bengal Engineers, F.R.S., late Surveyor-General and Superintendent Great Trig. Survey. *Athenæum Club, S.W.; and* 7, *Petersham-terrace, Queen's-gate-gardens, South Kensington, S.W.*
1867		Waveney, Lord, F.R.S., &c. 7, *Audley-square, W.; and Flixton-hall, Harleston.*
1868		Webb, Edward B., Esq., C.E., &c. 34, *Great George-street, S.W.*
1872		Webb, Geo. P., Esq. *Junior Athenæum Club, Piccadilly, W.*
1858		*Webb, Capt. Sydney. *Riversdale, Twickenham.*
1862		*Webb, William Frederick, Esq. *Army and Navy Club, S.W.*
1836		*Webber-Smith, Major-General James. 14, *Cambridge-square, Hyde-park, W.*
1865		Webster, Alphonsus, Esq. 44, *Mecklenburgh-square, W.C.*
1864		Webster, E., Esq. *North-lodge, Ealing, W.*
1858	2590	Webster, George, Esq., M.D., J.P. *Dulwich, S.E.*
1866		Webster, George, Esq. 40, *Finsbury-circus, E.C.*
1874		Webster, James Hume, Esq. *Keith-lodge, Upper Norwood.*
1860		Weguelin, Thomas Matthias, Esq., M.P. *Peninsular and Oriental Steam Navigation Co., Moorgate-street, E.C.*
1872		Weise, Jno., Esq. 103, *St. George's-road, Pimlico, S.W.*
1851		Weller, Edward, Esq. 34, *Red-lion-square, W.C.*
1873		Wellings, Henry, Esq. 44, *Thistle-grove, South Kensington, W.*
1853		*Wellington, Arthur Richard, Duke of, Major-General, D.C.L. *Apsley-house, W.; and Strathfieldsaye, Hampshire.*

Year of Election.

1870 *Wells, Arthur, Esq. *Nottingham.*

1872 Wells, J. C., Esq. *Southborough, Bickley, Kent.*

1864 2600Wells, Sir Mordaunt, late Chief Puisne Judge, Bengal. 107, *Victoria-st., S. W.*

1862 Wells, William, Esq. 22, *Bruton-street, W.; and Redleaf, Penshurst, Kent.*

1863 Welman, Charles, Esq. *Norton-manor, Taunton.*

1868 Wentworth, William Charles, Esq.

1874 *West, Rev. Arthur Nugent. *Albourne-place, near Hurstpierpoint; and Junior Oxford and Cambridge Club, Piccadilly.*

1857 West, Lieut.-Colonel J. Temple.

1870 West, Raymond, Esq., Bomb. Civ. Serv.

1873 West, William Nowell, Esq. 30, *Montagu-street, Russell-square, W.C.*

1872 Westendarp, Charles H., Esq. 51, *Lansdowne-road, Kensington-park, W.*

1873 Western, W. T., Esq. 11, *Montague-villas, Richmond, S.W.*

1863 2610*Westlake, John, Esq. 16, *Oxford-square, W.*

1853 Westmacott, Arthur, Esq. *Athenæum Club, S.W.*

1852 Weston, Alex. Anderdon, Esq., M.A. 74, *Queen's-gate, W.*

1862 Westwood, John, Esq. 8 *and* 9, *Queen-street-place, Southwark-bridge, E.C.*

1830 *Weyland, John, Esq., F.R.S. *Woodrising-hall, Norfolk.*

1866 Wharncliffe, Lord. 15, *Curzon-street, W.*

1861 Wharton, Rev. J. C. *Willesden-vicarage, N.W.*

1858 Wheatley, G. W., Esq. 150, *Leadenhall-street, E.C.*

1869 Whichelow, Rev. James Sherer. 7, *Crowland-terrace, Church-road, Islington, N.*

1853 *Whinfield, Edward Wrey, Esq., B.A. *South Elkington-vicarage, Louth.*

1839 2620*Whishaw, James, Esq., F.S.A. 32, *Harewood-square, N.W.*

1867 Whitaker, Thomas Stephen, Esq. *Everthorpe-hall, East Yorkshire; and Conservative Club, S.W.*

1868 Whitby, Rev. Thomas, M.A., &c. *St. John's-terrace, Woodhouse Moor, Leeds.*

1857 White, Arthur D., Esq., M.D. 56, *Chancery-lane, W.C.*

1865 White, Lieut. Arthur Wellesley, R.A. 10, *Pencester-street, Dover.*

1873 White, Francis W., Esq. *Ningpo, China. Care of H. C. Batchelor, Esq., 2 King William-street, E.C.*

1857 White, Henry, Esq., F.S.A., J.P. 96, *Queen's-gate, Hyde-park, W.; and The Lodge, Hillingdon-heath, near Uxbridge.*

1869 White, Robert Owen, Esq. *The Priory, Lewisham, S.E.*

1866 White, W. A., Esq., H.M. Consul, Dantzic. *Care of G. C. Rowland, Esq., Librarian's Dept., Foreign-office, S.W.*

1852 White, William Foster, Esq. *Treasurer, St. Bartholomew's-hospital, E.C.*

1863 2630*White, William O., Esq. 10, *Lime-st., E.C.; and Barnsfield, near Dartford, Kent.*

1873 *Whitehead, Chas., Esq., F.S.A. *Barming-house, Maidstone.*

1862 Whitehouse, William Matthew Mills, Esq. 46, *Chepstow-place, Bayswater, W.; and Hardwicke-house, Studley, Warwickshire.*

1873 Whitford, John, Esq. *Care of Messrs, Sinclair, Hamilton and Co.,* 17, *St. Helen's-place, E.C.; and Alfred-street, Liverpool.*

Year of Election.		
1874		Whitmee, Rev. S. J. *Samoa, South Pacific. Care of Rev. J. Mullens, London Mission House, Bloomfield-street, E.C.*
1865		Whymper, Edward, Esq. *Town-house, Haslemere.*
1864		Whyte, M. B., Esq. 83, *Belgrave-road, S. W.*
1870		Whyte, W. Anthony, Esq. *Conservative Club, S. W.*
1869		Whytt, Ebenezer, Esq. *The Grove, Highgate, N.*
1873		Whytt, P. Falconer, Esq. *The Grove, Highgate, N.*
1871	2640	Wiggins, Joseph, Esq. (Exam. in Navig., &c.). 4, *The Elms, Sunderland.*
1870		Wilder, Frederick, Esq. *Purley-hall, Reading.*
1867		Wilkins, J. E., Esq. 4, *Paper-buildings, Inner Temple, E.C.*
1866		Wilkinson, Alfred, Esq. 14, *Elvaston-place, South Kensington, S. W.*
1860		*Wilkinson, Major A. Eastfield, B.A. *Oudh Commission, India;* 7, *Cavendish-place, Brighton; and Army and Navy Club, S. W.*
1854		Wilkinson, Frederick E., Esq., M.D. *Sydenham, Kent, S.E.*
1865		Wilkinson, Dr. G. 4, *St. John's-wood-villas, St. John's-wood, N. W.*
1865		Wilkinson, J. J., Esq. 31, *Duke-street, Westminster, S. W.*
1839		*Wilkinson, Sir John Gardner, D.C.L., F.R.S. *Brynfield-house, Reynoldston, Gower, Glamorgan.*
1872		*Willans, John Anderson, Esq. 2, *Glasgow-terrace, Lupus-street, Pimlico, S. W.*
1857	2650	Willcock, J. W., Esq., Q.C. 6, *Stone-buildings, Lincoln's-inn, W.C.; and Rosenstead, Avenue-road, St. John's-wood, N. W.*
1872		Willems, Edouard Henri Léonard, Esq. 79, *Seymour-street, Hyde-park, W.*
1863		Williams, Frederick G. A., Esq. *Chapel-stairs, Lincoln's-inn, W.C.*
1868		*Williams, F. M., Esq. *Goonvrea, Penan, Arwerthal, Cornwall.*
1856		Williams, Henry Jones, Esq. 10, *Hereford-street, Park-lane, W.; and* 82, *King William-street, E.C.*
1856		Williams, Henry R., Esq. 183, *Camden-road, N.*
1873		Williams, John Robert, Esq. *Junior Carlton Club and Carlton-chambers,* 12, *Regent-street, W.*
1868		*Williams, Michael, Esq. *Treyullow, Scorrier, Cornwall.*
1857		Williams, Major-General Sir Wm. F., Bart., K.C.B., D.C.L., Commander-in-Chief, Canada. *Army and Navy Club, S. W.*
1867		Williams, W. Rhys, Esq., M.D. *Royal Bethlehem Hospital, S.*
1859	2660	Willoughby, Henry W., Esq. 35, *Montagu-square, W.*
1873		*Willis, Colonel G. H. S., C.B. *United Service Club, Pall-mall, S. W.*
1870		Wills, Peter Turner, Esq. *Blackheath-park, Blackheath, S.E.*
1867		Wills, William Henry, Esq., J.P. *Hawthornden, Clifton Down, Bristol.*
1868		Wilson, Alexander, Esq. *Gatewick-house, Beckenham..*
1869		Wilson, Major Charles William, R.E. *Adair-house, St. James's-square, S. W.*
1865		Wilson, E., Esq. *Hayes-place, Bromley, Kent.*
1872		Wilson, John Peter, Esq. *The Mount, Totnes, South Devon.*
1872		Wilson, Robert B. W., Esq. 3, *Beaufort-gardens, W.*
1862		*Wilson, Robert Dobie, Esq. 15, *Green-street, Grosvenor-square, W.*
1869	2670	Wilson, Samuel King, Esq. 3, *Portland-terrace, Regent's-park, N. W.*

Year of Election.	
1860	Wilson, Thomas, Esq. 38, *De Beauvoir-road, Kingsland, N.*
1869	Wilson, Rev. T. Given, B.A. 23, *Wynell-road, Forest-hill, S.E.*
1854	*Wilson, Major Thomas, R.N.
1872	Wilson, William Thomas, Esq. *Deutz, near Cologne.*
1866	Wiltshire, Rev. Thomas, M.A., F.G.S., F.L.S. 25, *Granville-park, Lewisham, S.E.*
1868	*Winch, W. Richard, Esq. *Chislehurst, Kent.*
1870	Winchester, C. A., Esq. *Oriental Club, W.*
1873	Windram, James, Esq. (Banker). 80, *King William-street, E.C.*
1863	Wingate, T. F., Esq. 18, *Albion-street, Hyde-park-square, W.*
1873	2680Winslow, Eugene Henry, Esq. *War-office, Pall-mall.*
1870	Wiseman, James, Esq. 1, *Orme-square, Bayswater, W.*
1870	Wiseman, Commr. W., R.N. 88, *Belgrave-road, S.W.; and Lagos, W. Africa. Care of Messrs. Case and Loudensack, 1, James-street, Adelphi, W.C.*
1864	Wodehouse, J. H., Esq., H.M.'s Commissioner and Consul-General for the Sandwich Islands.
1870	Wodehouse, Sir Philip, K.C.B., Governor of Bombay. *Care of E. R. Wodehouse, Esq.*, 17, *Half-moon-street, Piccadilly, W.*
1866	*Wolff, Sir Henry Drummond, K.C.M.G., M.P. 15, *Rutland-gate, S.W.; and Athenæum Club, S.W.*
1873	Wonnacott, Jno., Esq., F.G.S. &c. 15, *Haddington-road, Stoke, Devonport.*
1872	Wood, Captain Alexander (Bombay Staff Corps). *Heath-lodge, Abbey-wood, Kent, S.E.; and* 14, *St. James's-square, S.W.*
1873	Wood, Chas. Malcolm, Esq. *Heath-lodge, Abbey Wood, Kent; and Junior Athenæum Club, S.W.*
1873	Wood, Gilbert, Esq. *Percy-villa, Warren-road, Bexley-heath, Kent.*
1863	2690Wood, Henry, Esq. 10, *Cleveland-square, Hyde-park, W.*
1868	*Wood, Richard Henry, Esq., F.S.A. *Crumpsall, near Manchester.*
1870	Wood, Captain T. P. *Holly-bank, Rusthall, Tunbridge-wells.*
1857	Woodhead, Major H. J. Plumridge. 44, *Charing-cross, S.W.*
1867	Woodifield, Mathew, Esq., M.I.C.E. *General Colonial Manager, Cape Copper Mining Co., Namaqualand, Cape of Good Hope.* 43, *Ladbroke-grove-road, Notting-hill, W.*
1873	*Woodroffe, John W. Allen, Esq. 14, *Thurlow-road, Hampstead, N.W.*
1862	Woods, Samuel, Esq. *Mickleham, near Dorking, Surrey.*
1864	Woolcott, George, Esq. 78, *Palace-gardens-terrace, Kensington, W.*
1863	*Worms, George, Esq. 17, *Park-crescent, Portland-place, W.*
1845	Worthington, Rev. James, D.D. 27, *John-street, Bedford-row, W.C.*
1856	2700Worthington, J. Hall, Esq. *Alton-hall, Oxton, near Birkenhead.*
1866	*Worthington, Richard, Esq. 7, *Champion-park, Denmark-hill, S.E.*
1866	Wotton, William G., Esq., M.D. 15, *Clement's-inn, W.C.*
1839	*Wyld, James, Esq. *Charing-cross, W.C.*
1863	Wylde, W. H., Esq. *Foreign-office, S.W.*
1871	Wynne-Finch, Charles, Esq. 4, *Upper Brook-street, W.*
1867	*Wythes, George Edward, Esq. *Epping, Essex.*

Year of Election.	
1869	Yardley, Sir William. *Hadlow-park, Tunbridge, Kent.*
1854	Yeats, John, Esq., LL.D. 7, *Beaufort-square, Chepstow, Monmouth.*
1861	York, Most Rev. William Thomson, Archbishop of, F.R.S. *Bishopsthorpe, York.*
1859	2710 Yorke, Lieut.-General Sir Charles, K.C.B. 19, *South-st., Grosvenor-square, W.*
1830	*Yorke, Colonel Philip J., F.R.S. 89, *Eaton-place, S.W.*
1857	*Young, Allen, Esq. 1, *St. James's-street, S.W.*
1838	*Young, Charles Baring, Esq. 4, *Hyde-park-terrace, W.*
1874	*Young, Charles Edward Baring, Esq. 12, *Hyde-park-terrace, W.*
1830	*Young, James, Esq.
1858	Young, James, Esq. *Kelly, Wemyss Bay, by Greenock.*
1866	Young, John, Esq., F.S.A. *Vanbrugh-fields, Blackheath, S.E.*
1857	Yule, Colonel Henry, C.B., Bengal Engineers. *Messrs. Grindlay & Co.*, 55, *Parliament-street, S.W.*
1864	2719 Zwecker, J. B., Esq. 2, *Denmark-terrace, Brentford-road, W.*

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Anthropological Institute
Antiquaries, Society of
Architects, Inst. of British (Royal)
Arts, Society of
Asiatic Society (Royal)
Astronomical Society (Royal)
Athenæum Club
British Museum, Library of
Cambridge Union Society
——— University. The Library
Colonial Office
Dublin, Royal Irish Academy
——— Trinity College Library
——— Geological Society (Trin. Coll.)
Edinburgh, Royal Society of
———, The Library of Advocates
———, Geological Society of
Education Department, Library of
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1833.—Mr. John Biscoe—Royal Medal—for the discovery of the land now named "Enderby Land" and "Graham Land," in the Antarctic Ocean.

1834.—Captain Sir John Ross, R.N.—Royal Medal—for discovery in the Arctic Regions of America.

1835.—Sir Alexander Burnes—Royal Medal—for the navigation of the River Indus, and a journey by Balkh and Bokhara across Central Asia.

1836.—Captain Sir George Back, R.N.—Royal Medal—for the discovery of the Great Fish River, and its navigation to the sea on the Arctic Coast of America.

1837.—Captain Robert FitzRoy, R.N.—Royal Medal—for the survey of the Shores of Patagonia, Chile, and Peru, in South America.

1838.—Colonel Chesney, R.A.—Royal Medal—for the general conduct of the "Euphrates Expedition" in 1835-6, and for accessions to the geography of Syria, Mesopotamia, and the Delta of Susiana.

1839.—Mr. Thomas Simpson—Founder's Medal—for the discovery and tracing, in 1837 and 1838, of about 300 miles of the Arctic shores of America.

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Surveyor-General's office, Colombo. September 1871. J. L. GRINLINTON, Esq. Through H. W. Bristow, Esq.

PERSIA, &c.

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Bancroft's Map of California, Nevada, Utah, and Arizona. Scale 1 inch = 20 miles (geo.). San Francisco. 1872.

A Map of Augusta Co., Virginia. Prepared under the direction of the Board of Survey of Washington College, Va. By Major Jed. Hotchkiss, Topographical Engineer. Scale 1 inch = 1 stat. mile. In 2 sheets .. .. The AUTHOR.

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Trabalhos Hydrographicos do Norte do Brazil, dirigidos pelo Capitão de Fragata d'A. N. I., José da Costa Azevedo: Primeiros tracos geraes da Carta particular do Rio Amazonas no curzo Brazileiro, levantada pelo St. João Soares Pinto, Capitão tenente d'A. N. I. 1862–64. J. BENTOR, Esq.

Carte de l'Isthme de Panama et de Darien, et de la province du Choco, par M. Augustin Codazzi. Rédigée par H. Kiepert. Scale 1 inch = 11 miles (geo.). 2 sheets. Berlin; D. Reimer. 1857. By PURCHASE.

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Der Grosse Australische uberland-Telegraph, nebst Übersicht des ganzen Telegraphen-netzes in Australien. Von A. Petermann. Scale 1 inch = 140 miles (geo.). Gotha; Justus Perthes. 1873. Dr. PETERMANN.

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C. R. MARKHAM, Esq.

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3003 Carte des Iles Philippines, Célèbes et Moluques. 1871.
3004 Détroit de Pe-tche-li. 1871.
3005 Porte de Yaté (Nouvelle Calédonie). 1871.
3006 Entrée de la Cazamance (Ouest Afrique). 1871.
3007 Côte nord-ouest d'Espagne, entre la Pointe de l'Estaca et le Rio Mino. 1871.
3008 Rivières Mellacory et Foricarriah (Ouest Afrique). 1871.
3009 Rade de Pernambuco (Brésil). 1871.
3010 Rivières Brass et St. Nicolas (Ouest Afrique). 1871.
3011 Carte de la partie sud de l'Ile de Mindanao. 1871.
3012 Port Caledonia et Port Escocés (Isthme de Darien). 1871.
3013 Rivière Cameroon (Ouest Afrique). 1871.
3016 Goulet Anglais (Patagonie). 1871.
3017 Baie Liberta (Patagonie). 1871.
3018 Port de Cartagène (Sud Amérique). 1872.
3019 Cours de la Cazamance (Ouest Afrique). 1871.
3021 Plan de l'embouchure de la Seine. 1871.
3023 } Carte particulière de la côte septentrionale d'Afrique.
3024 } 10me et 12me feuille. 1871.
3026 Port de Tarragone (Mer Méditerranée). 1871.
3027 Plan de la Baie d'Ergastiria (Grèce). 1871.
3028 Ile de Pâques ou Rapa Nui (Sud Pacifique). 1872.
3029 } Carte particulière de la côte septentrionale d'Afrique.
3030 } 6me et 9me feuille. 1872.
3031 Carte des Iles Sumatra, Java et Bornéo. 1872.
3032 Côte ouest de France, Ouessant à la Loire. 1872.
3033 Côte ouest de France, Lorient à la Gironde. 1872.
3036 Carte particulière de la côte septentrionale d'Afrique. 8me feuille. 1872.
3037 Baie Coriseo (Ouest Afrique). 1872.
3038 Plan du Havre de St. Jean (Terre Neuve). 1872.
3039 Rivière du Vieux Calebar (Ouest Afrique). 1872.
3040 Rivières de Bonny et du Nouveau Calebar (Ouest Afrique). 1872.
3041 Côte est d'Australie. 8me feuille. 1872.
3043 Carte particulière de la côte septentrionale d'Afrique. 7me feuille. 1872.
3044 Baie aux Outardes (Terre Neuve). 1872.
3046 Mouillage du Petit Havre (Guadeloupe). 1872.
3048 Plan de la Baie de Barquero (Espagne). 1872.
3049 Mouillage de Mollendo (Peru). 1872.
3050 Entrée de la Rivière Maullin, Port Abtao et Port Montt. (Chile) 1872.
3051 Passe Victory et Puerto Bueno (Patagonie). 1872.
3058 Plan de l'entrée du Rio Nervion (Espagne). 1872.
3059 Ile de la Trinité (Trinidade). 1872.
3060 Plan du Port de St. Jean (Terre Neuve). 1872.
3061 Carte particulière de la côte septentrionale d'Afrique. 11me feuille. 1872.
3062 Golfe de Corinthe (Grèce). 1872.
3063 Plan de la Baie de Holyhead. 1872.

Maps, Charts, &c. *Donors.*

3064 Côte sud-ouest de Tahiti, entre Paea et Ataiti. 1872.
3065 Côte sud-ouest de Tahiti entre Ataiti et Tehupo. 1872.
3066 Détroit de Preveza (Grèce). 1872.
3068 Mouillage de Sa. Juan Bautista (Juan Fernandez I.). 1872.
3073 Plan de Whitehaven (Nouv. Ecosse). 1872.
3076 Iles Printain et Redang (Péninsule Malaise). 1872.
3077 Tringano et Port de la Grande Redang (Golfe de Siam). 1872.
3079 Port de Tello Motou, Rivière Gorontalo, Baie Dwaal et Baie Lobie (Celebes). 1872.
3087 Carte particulière des côtes de Suède, de Winga aux Paternoster. 1872.
3088 Baie Calandorang et Baie Clarendon (Ile Balabac, N. Pacifique). 1872.
3089 Port Sud (Ile Balabac). 1872.
3090 Port Nord (Ile Balabac). 1872.
3091 Port Sorsogon (Luzon). 1872.
3092 Port Sibonga, Port Gabo, Port Surigao (Philippines). 1872.
3093 Partie sud de l'Ile de Samar (Philippines). 1872.
3094 Port Palapa (Samar I.). 1872.
3098 Baie Laguinmanoc, Port Mariveles, et Golfe de Magnoc (Luzon). 1872.
496 Route des Bâtiments à Vapeur dans l'Océan Indien, d Aden au Détroit de la Sonde et retour. 1872. 5 Maps, with letterpress.
DÉPÔT DES CARTES ET PLANS DE LA MARINE, Paris.

GERMAN—

Segel-Karte des Südlichen Theils der Ost-see zu Preussens See-atlas, herausgegeben von dem Königlichen Ministerium des Handels. Zweite Ausgabe. Scale 1 inch = 6 miles. 4 sheets. Berlin; D. Reimer. 1870 .. .. By PURCHASE.

Six Charts of the German Coasts of the North Sea:—
1. Die Deutsche Bucht der Nordsee. Scale $\frac{1}{300000}$. 1871. 4 sheets.
2. Ostfriesische Inseln, Westlicher Theil, mit der Ems Mündung. Scale $\frac{1}{100000}$. 1872.
3. Ostfriesische Inseln, Ostlicher Theil, mit Jade und Weser Mundung. Scale $\frac{1}{100000}$. 1872.
4. Specialkarte der Eider. Scale $\frac{1}{50000}$. 1871.
5. Übersichtskarte der Schleswig-Holsteinschen Westküste. Scale $\frac{1}{100000}$. 1869. 2 sheets.
6. Übersichtskarte der Jade, Weser und Elbe Mündungen. Scale $\frac{1}{100000}$. 1871.

Herausgegeben vom Marine Ministerium. Berlin; D. Reimer.
By PURCHASE.

MISCELLANEOUS.

Photograph of a raised Model of France. Scale 1 inch = 2 degrees.
THOMAS SOPWITH, Esq., F.R.G.S.

A Diagram or Projection of the Barometer, Thermometer, Depression of Wet Bulb, Hourly Direction and Velocity of Wind, and Rainfall, as recorded at Madras Observatory, about the time of the Cyclone of May, 1872. By N. Everard Pogson, Assistant-Government Astronomer.

Physikalische Karten von A. Steinhauser.
1. Warmverbreitung.
2. Oceanographie.
3. Magnetismus der Erde .. .. ANTARIA AND Co., Vienna.

I. Schichten Relief Karte des Herzogthumes Kärnthen. By Captain Fischer von See; after the Hypsometrical Maps of Steinhauser and Streffleur.—II. Paper Relief Maps of Upper and Lower Austria,

Maps, Charts, &c.	*Donors.*
Bohemia, Environs of Lyon, and of the Bed of the English Channel. —III. Illustrations on the Methods of Hill-drawing in modern use.	Captain FISCHER VON SEE, Vienna.
Four Photographic Views of St. Paul de Loanda ..	Lieutenant GRANDY.
I. Chinese Landscape, on roller—II. Sixteen copies of old Chinese and Manchoo Inscriptions.—III. Chinese view of the "Golden" and "Silver" Islands in the Yang-tsze-kiang.—IV. Ten scrolls, with Chinese or Manchoo characters.—V. A copy of the Singan inscription, on roller.—VI. A Chinese scroll, partly Astrological, partly Astronomical	WILLIAM LOCKHART, Esq.
A projection of so much of the Celestial Sphere as is visible throughout the year from any one selected spot, with a Planisphere projected for the latitude of London. By Major-General Harness, R.E.	The AUTHOR.
Four MS. Planispheres, on Stereographic projections of the Earth and the Heavens. 1757	From the Christy Collection, Through AUGUSTUS W. FRANKS, Esq.
22 Vorlegeblätter für Plan u. Terrain-Zeichnung, von Otto Wolf. Scale $\frac{1}{12500}$. Berlin; J. H. Neumann	By PURCHASE.

INSTRUMENTS LENT TO TRAVELLERS.

H. WHITELY, Esq., in South Peru, March 28, 1867—

Pocket Aneroid, No. 89, graduated to 15 inches, by Cary.
Hypsometrical Apparatus, and 3 Boiling-point Thermometers, by Casella.

Lieut. V. L. CAMERON, R.N., Zanzibar, 1872—

Two Aneroids, Nos. 176 and 236, graduated to 15 inches, by Cary.
One Compass prismatic, with Lens.
One Artificial Horizon, small, Capt. C. George's pattern.
One Do. Do. roofed.
One Hypsometrical Apparatus, and 7 B. P. Thermometers.
One Brass Protractor, semi-circular.
One Rain Gauge and Measure.
One Sextant, 8-inch, by Troughton.
One Sextant, 6-inch, by Cary.
One Theodolite, 5-inch, with stand, by Troughton.
One Astronomical Telescope.
Also New Instruments to the value of 67*l.* 17*s.* 11*d.*

Lieut. W. J. GRANDY, R.N., Congo Expedition, 1872—

One Prismatic Compass, with stand.
One Artificial Horizon, roofed.
Two Hypsometrical Apparatus, with 7 B. P. Thermometers.
One Sextant, 6-inch, by Cary
One Scale, German Silver, Standard of Measure 18 inches.
Also New Instruments to the value of 123*l.* 11*s.* 4*d.*

PRESENTATION

OF THE

ROYAL AND OTHER AWARDS.

(At the Anniversary Meeting, May 26th, 1873.)

ROYAL MEDALS.

THE Founder's Medal for the year 1873 was awarded by the Council of the Society to Mr. Ney Elias, for the enterprise and ability he displayed in surveying the new course of the Yellow River in China, in 1868: and for his recent journey through Western Mongolia, *viâ* Uliassutai and Kobdo, during which he has taken a large series of observations for fixing positions and altitudes. The Victoria or Patron's Medal had been awarded in advance, on the 21st October, 1872, to Mr. H. M. Stanley, for his Relief of Livingstone, and for bringing his valuable journal and papers to England, as related in the 'Proceedings' of the Society, vol. xvi. p. 441.

The PRESIDENT made the following introductory remarks regarding the Medals of the year:—

"As our proceedings this year in regard to the distribution of the Royal medals are peculiar, perhaps it may be satisfactory to the Fellows if I give a brief explanation before calling up the Medallists. The Fellows are aware, then, that the Society presents two Gold Medals yearly to those who we think have rendered the greatest service to Geography at the time of the award. Last autumn, after the medals of the year had been presented, Mr. H. M. Stanley arrived in England, with the very gratifying intelligence that he had not only found and relieved Livingstone, but had travelled with him round the northern end of Lake Tanganyika, and had brought his journals, registers of observations, and other papers to

England. This service appeared to us of such importance that after due deliberation the Council decided to award to Mr. Stanley one of the medals of the following year, and as Mr. Stanley's stay in England was limited, I announced the award to him at a public banquet, which was given by the geographers in his honour before his departure to America. In due course the medals were prepared, and, with the approval of the Council, I at once forwarded Mr. Stanley's medal to America, through the United States Minister at this court, who duly acknowledged the honour. It appears, however, that before the medal reached America, Mr. Stanley had left for Spain, and it remains accordingly in the hands of Mr. Fish, the Foreign Minister of the United States, to await his return. I regret much that Mr. Stanley should not have been able to attend here this day in person to have received the medal at my hands, as I am sure we should have been glad of the opportunity of marking our appreciation of the really gallant service which he performed in relieving Livingstone, and of showing by the cordial reception of our Medallist that we are sincerely gratified at such honours having fallen to the lot of an American citizen."

On presenting the Founder's Medal to Mr. Elias, the President addressed him as follows:—

"Sir,—The Council of the Royal Geographical Society has for many years past watched with an ever increasing interest the ardour and ability which have been displayed by you in geographical research. The adventurous journey which you made in 1867 up the Tsien-tang River, and your careful exploration of its course for 140 nautical miles, with the aid of sextant and chronometer, were an earnest of your powers as a skilful and accurate surveyor. Those powers were brought more prominently before us when, in the course of the following year (in company with Mr. H. G. Hollingworth), you travelled 400 miles from Shanghai by the Grand Canal, and then conducted an exhaustive survey of the new bed of the Yellow River for 370 miles from Kai-fung to the sea. Of such importance, indeed, to geographical science, and so highly creditable to yourself, did my predecessor in this chair, Sir R. I. Murchison, consider the information to be which you were thus able to furnish regarding 'that remarkable phenomenon, the diversion by spontaneous movement of the waters of the great Hoang-Ho,' that he gladly gave a place in our Journal to your Map and Memoir, and further drew special

attention to your journey in his Anniversary Address for 1871. A supplementary memoir on the old course of the Yellow River, which you surveyed in 1870, was also published by us in the same volume of the 'Journal;' and it was noted to your particular credit, and as an example well worthy of imitation by travellers in little known countries, that you fixed all your positions by astronomical observation, and worked your traverses with the care and regularity of a professional surveyor.

"It has been, however, through your journey of last year from China to Europe that you have now taken rank among us as one of our most accomplished and successful travellers, and have thus secured the geographical blue ribbon of the year. To say that you have travelled from the Great Wall of China through the almost unknown steppes and mountains of Mongolia, a distance of nearly 2500 statute miles, to the Russian frontier, and have continued your route from that point for 2300 miles further to Nijni Novogorod, where the railway system of Europe first commences, would give a very inadequate idea of the value and importance of your journey. That which has influenced the Council of the Royal Geographical Society in awarding to you the Founder's Gold Medal of the year—even more than your being the only Englishman who has ever traversed the Asiatic continent from end to end upon this line—has been the indefatigable industry which you have displayed in carrying through your entire route a continuous series of observations. I find on referring to the register—1stly, that 231 astronomical observations have been taken by you for latitude and longitude; 2ndly, that altitudes are recorded at nearly every station (106) between Kalgan and Bisk, obtained either from boiling-point or aneroid observations, thereby giving a section of the whole route, which measures nearly 2000 geographical miles; and 3rdly, that a continued traverse was carried on between Kuei-hua-cheng and Suok, about 1340 geographical miles, without intermission. These are achievements which would reflect credit on the practised officers of our Engineer services, who are charged with great national geodetical operations. That they should have been accomplished, at his own expense, by a young amateur surveyor, who, in the words of Sir R. I. Murchison, 'pursued his travels in China through a pure love of geographical exploration, during holidays taken from active commercial pursuits,' does, indeed, strike one with astonishment.

"Mr. Ney Elias, in presenting to you this medal on behalf of the Council of the Royal Geographical Society, I take leave to record my opinion that you have performed one of the most extraordinary journeys of modern times, and one which, accompanied as it is with solid scientific results, will live in the memory of geographers, after travels which are the mere record of personal adventure have been long forgotten. I congratulate you, Sir, that, at so early an age, your name should be inscribed on our 'golden roll' of geographers, and I feel assured that we may yet look to many future triumphs that await the continued prosecution of your travels."

Mr. Ney Elias replied:—

"Mr. President,—I have to express my most heartfelt thanks for the great honour you are bestowing on me to-day and also for your kind and encouraging remarks, and for the way they have been received by the Society. I have only to add, that at the same time that I accept with the utmost gratitude this much valued prize, I regret that circumstances did not admit of my carrying out the last journey as originally planned, and in a way that would have rendered it all the more worthy of so magnificent a reward. Nothing, however, can be more gratifying than to find our efforts so splendidly and so kindly rewarded, even though not attended by the fullest measure of success; and as it is I shall endeavour to regard this less in the light of laurels for the past than as an encouragement to future efforts, and shall make it my aim, in any further explorations I may be engaged upon, to maintain the Society's high reputation for geographical research, and endeavour to earn for it, rather than for myself, any possible distinction that lies in my power."

OTHER AWARDS.

A Gold Watch, with a suitable inscription, was awarded to Thomas Baines, for his long continued services to Geography, and especially for his journeys in South-Western and South-Eastern Africa, and the Route Maps constructed by him over large tracts of the interior.

The President, in announcing this award, stated that the watch would be presented to Mr. Baines on his return to England.

A similar watch was awarded to Captain Carlsen, for his dis-

coveries in the Arctic Seas, and for having circumnavigated the Spitzbergen as well as the Nova Zembla groups.

His Excellency Baron Hochschild, Swedish Minister, received the watch on behalf of Captain Carlsen, the President addressing him as follows:—

"Excellency,—The merits of your countryman, Captain Carlsen, are so conspicuous as a navigator and discoverer that the Council of the Royal Geographical Society of London have resolved to present him with a gold watch, in token of their admiration and esteem.

"In 1863, Captain Carlsen, in the brig *Jan Mayen*, circumnavigated Spitzbergen, being the only navigator who has ever accomplished this feat. In 1871 he also, in the schooner *Solid*, circumnavigated Nova Zembla, and discovered the relics of the famous Dutch Captain Barents, which are now preserved in the Museum at the Hague. At present he is serving on board the *Tegethoff*, in Lieutenant Payer's Austrian Expedition to the Arctic Seas, and will share in the credit of such discoveries as they may make along the Siberian coast.

"It will enhance, we think, the value of the honorary award which we desire to present to Captain Carlsen if your Excellency, as the representative in this country of his Majesty the King of Sweden, and yourself a zealous friend to Geography, will consent to convey to him the gold watch which I accordingly place in your hands."

BARON HOCHSCHILD, in receiving the watch, said:—"It is with great pleasure, Mr. President, that I act as the representative of Captain Carlsen on this occasion. It is a great honour to be deemed worthy of such a testimonial from the Council of the Royal Geographical Society, and I trust that Captain Carlsen will continue to labour in the same direction, and strive to achieve still more for science and civilisation."

PUBLIC SCHOOLS PRIZE MEDALS.

MR. FRANCIS GALTON, on being called upon by the President to state (as Chairman of the Public Schools Prizes Committee) the results of the examinations of the year, spoke as follows:—

"It is my pleasing duty to announce that there has again been an

increase in the number of candidates for our medals, and of schools who have furnished those candidates. In 1871, 10 schools sent 25 boys; in 1872, 11 schools sent 38 boys; and in this year, 16 schools have sent 48 boys.* The reports of the Examiners, which will be published, show that the performance of the candidates is very creditable to them. Last year Eton entered the lists for the first time, and this year Winchester has also joined company: it is a great pleasure to us to witness the success of these old and renowned schools in our examinations.

"The Committee of Prizes, being anxious to inform themselves of the views of the Head Masters on their programmes of examination, circulated a few questions on various points, inviting criticism and suggestions. It has been a great gratification to us to be assured that in all important matters our efforts have given them much satisfaction. I will read short quotations from two of the letters as examples. In answer to an inquiry whether our examination accords fairly with the range of study at the schools, the Rev. Charles Abbott, D.D., Head Master of the City of London School, simply states—'The Papers do not "accord with the range of study" in my school as it is, but they accord with it as it ought to be.'

"The Rev. George Butler, Head Master of Liverpool College, who has furnished us with so many Medallists, has sent us a long and valuable communication full of instructive suggestions. He concludes by saying:—

"'I desire to bear emphatic and grateful testimony to the good which has been effected by the Royal Geographical Society as represented by the Public Schools Prizes Committee. They have encouraged the study of Geography by offering liberal rewards. They have guided the studies both of Teachers and Pupils in the Public Schools by their published directions, and by the recommendation of books. And they have drawn the attention of *Book-Students* to the really *practical* ends for which Geography should be studied, by the

* The following are the awards of the Examiners for the year:—PHYSICAL GEOGRAPHY: *Gold Medal*, W. C. Hudson, age 18, Liverpool College; *Bronze Medal*, W. A. Forbes, age 17, Winchester College. *Honourably Mentioned*, A. C. Cole, age 18, Eton College; R. C. Reade, age 19, Eton College; H. H. Hancock, age 15, Bristol Grammar School; H. Louis, age 17, City of London School; N. M. Richardson, age 17, Winchester College; G. S. Pawle, age 17, Haileybury College; G. R. Townsend, age 17, Haileybury College; W. S. Widdicombe, age 16, Haileybury College.

POLITICAL GEOGRAPHY:—*Gold Medal*, S. E. Spring Rice, age 16, Eton College; *Bronze Medal*, A. T. Nutt, age —, University College School. *Honourably Mentioned*, A. Williams, age 18, Uppingham School; W. L. Kingsford, age 16, Rossall School; G. H. Sing, age 16, Liverpool College; S. H. B. Saunders age 16½, Dulwich College; A. Hassall, age 19, Uppingham School.

appointment of Examiners, not only eminent for their literary and scientific attainments, but distinguished for their original researches and intimate knowledge of distant countries and their products. The acceptance by such distinguished men of the office of Examiners for the Public Schools' Prizes is of the highest value to the cause of Geographical study, not only because it ensures the highest order of examination, but because it enhances the value of any reward which the successful student may obtain.'

"I will here remind the Society that, the subject of our special Paper of this year being Central Asia, we had the good fortune to secure for our examiners no less authorities than our own President, Sir Henry Rawlinson, for Political Geography, and the President Designate of the Royal Society, Dr. Joseph Hooker, the eminent botanist, and who was a celebrated traveller in former days in the Sikhim Himalaya, for Physical Geography.

"I will now beg your especial attention to the following paragraph in the Rev. Mr. Butler's letter, which, coming as it does from a Head Master of a school which has gained more than its quota of university honours, and who himself is a classical scholar of the highest distinction, very effectually meets objections that used to be frequently made to our examinations. He says:—

"'I may also bear testimony to the fact that time given to geographical study at school is no hindrance to academic studies. The three last instances of College and University honours gained by the pupils of Liverpool College bear out this. A scholarship and an exhibition at University College, Oxford, and a Bell University scholarship at Cambridge have within the last few weeks been gained by former Medallists of the Royal Geographical Society. It will be a satisfaction to the Committee to be assured that the encouragement given by them to literary and scientific pursuits of a general and in some sense of a popular character does not seem to weaken the power of application required to classical and mathematical studies.'"

Mr. Galton and the Hon. G. C. Brodrick introduced the prizemen to the President, who addressed the Gold Medallist for Physical Geography as follows:—

"Mr. Hudson,—I have the pleasure to present you with our first Gold Medal of the year, and congratulate you on this honourable testimony to your proficiency in the study of Physical Geography. The alumni of the Liverpool College occupy a prominent place among our prizemen, thereby testifying to the excellent course of geographical instruction pursued in that establishment. Believing, as I do, that such geographical studies form a most important element in the proper education of an English gentleman, I earnestly hope that the example of Liverpool College may be generally

followed, and that your own success may excite others to similar exertions."

Next followed the Bronze Medallist in Physical Geography:—

"Mr. Forbes,—You are the first prizeman, I believe, who has come up from Winchester College. I am delighted to find that the college, which has produced so many of our best scholars and statesmen, should have now admitted a systematic study of Geography into the curriculum of the school. I congratulate you on your success, and I trust that your fellow collegians will, in future, often come forward to compete for the Geographical Medals."

On the Gold Medallist for Political Geography being presented, the President thus addressed him:—

"Mr. Spring Rice,—I had the pleasure last year of presenting you with our Gold Medal for Physical Geography; this year you have borne off the same honour in Political Geography, being thus the only 'double first' who has yet appeared on our roll of prizemen. Having myself had the advantage of looking over your examination papers, I may say I have been astonished at the extent and accuracy of your knowledge of the Political Geography of Central Asia. Your success, certainly, does the greatest credit to your Eton training, as well as to your own ability and industry, and I heartily congratulate you on having gained the medal which I now put into your hands, and which, I hope, you will ever cherish as an honourable and proud distinction."

Mr. Nutt, the Bronze Medallist, being absent on the Continent, was represented by Mr. McGee, a master of the University College School. The President said:—

"I am happy to present you with the Bronze Medal, which has been awarded to your pupil as the second prizeman in Political Geography, and I will add that, judging from the general scope and correctness of his answers, his aggregate number of marks would have run the first prizeman very hard if he had taken up all the questions, instead of limiting himself to nine out of twelve. Geography must be well taught at University College School, to have produced such a result, and Mr. Nutt must be a very ready and promising scholar. I sincerely congratulate you on your pupil's success."

The PRESIDENT, in conclusion, said:—

"Among those who have been honourably mentioned by the Examiners, and whose names I propose to read to you, Mr. Cole, of Eton College, the son of an old Fellow of our Society, has been brought so conspicuously forward that it has been determined to present him with an Atlas, so that he may rank immediately after the Medallists. I am informed that Mr. Cole and Mr. Spring Rice, who have thus shown such remarkable proficiency in geographical studies, are both excellent mathematicians, and also stand very high in Classics. And I am the more anxious to mention this circumstance as an impression has gone abroad that scientific pursuits, such as acquiring a knowledge of Physical and Political Geography, interfere with the study of Classics and Mathematics, whereas I believe that all such studies mutually assist each other, as they certainly contribute in almost equal proportions to form a thoroughly educated gentleman."

ADDRESS

TO

THE ROYAL GEOGRAPHICAL SOCIETY.

Delivered at the Anniversary Meeting on the 26th May, 1873.

By Major-General Sir H. C. Rawlinson, K.C.B., etc.,
President.

Gentlemen,

I am glad to be able to address you again in this noble hall, where, by the kind favour of the Senate of the University of London, we are still permitted to hold our meetings. We have not altogether abandoned the hope that, in consideration of the services which we render to the public by facilitating the discussion of many questions of deep national interest, the Government may, sooner or later, see fit to provide us with suitable accommodation for our gatherings, either in a separate building or as joint occupants of some Central Hall of Science; but in the mean time we thankfully accept the generous assistance afforded us by the governing body of the University of London, and trust that they will find their reward, not merely in the grateful acknowledgments of a body of Geographers, but in the growing taste for Geographical studies which through their aid we have been enabled to diffuse abroad, to the great advantage of our national character as explorers and scientific travellers.

I am also happy that at this Anniversary Meeting, which terminates my allotted two years' tenure of office, I do not yield up a "damnosa hæreditas" into the hands of my successor, but that, on the contrary, I leave the Society in a more flourishing condition than it has ever previously attained—more flourishing in numbers, in income, in reputation, and, above all, in the extent of its sphere of usefulness. During the past year, as you have learnt from the Report of the Council, 225 new Fellows have been elected, which, after deducting losses by death and resignation, gives a net

increase to our numbers of 140—a larger reinforcement than we have received in any year since 1864. It is indeed with great satisfaction that I am able to announce that the Society, including Honorary Members, now numbers 2700 Fellows; that our annual income exceeds £6000; and that our capital, obtained from bequests, accumulations of subscriptions, &c., amounts to about £25,000, which is partly invested in the freehold property in Savile Row, and partly in public securities. Remembering also, as I do, that the prosperity of a Society like ours depends not so much on the number of its members, as on their knowledge and efficiency—not so much on the extent of its resources as on the purposes to which those resources are devoted, I am proud to be able to refer to the pages of the forty-second volume of the 'Journal,' which is now on the eve of publication, and to the record of our proceedings during the past year, as the gauge of our prosperous condition. Never, since our foundation in 1830, have we shown greater activity than during the period now under review, in fitting out expeditions, and furnishing correct Geographical information to the public. Three African expeditions have been organized under our auspices, two of which are now pushing their way into the interior from the east and west coasts respectively. We have revived also the long-slumbering but not forgotten question of Arctic discovery, and hope that, ere another year has passed over us, we may, in co-operation with other scientific bodies, have induced the Government to send an exploring expedition up Smith Sound towards the Pole. Our evening meetings have been numerously attended by all classes—from Princes of the Blood to the humble working student—all eager for information on that subject of special interest at the present moment, "the Geography of Central Asia;" and I believe I may say that, with the help of maps and diagrams and explanatory notices, the intelligent curiosity of the public on this topic has been amply gratified. Of our publications, too, we may be justly proud. The 'Journal' of the year is the largest we have ever published, containing as it does above 500 pages of most valuable Geographical matter, while we are also issuing gratuitously to the Fellows, a supplementary volume containing translations of the travels of the Portuguese in Central Africa. I must also notice the many valuable additions that have been made to our collection of maps. Under the discriminating guidance of Mr. Keith Johnston, application has been made to all the Governments of Europe for the most important Geographical documents which they have severally published, and the appeal has been nobly responded to, upwards of 3500

sheets having been during the year added to our store, equally valuable as specimens of the most elaborate Cartography and as records of the latest Geographical data.

OBITUARY.

Commodore Mathew Fontaine Maury.—This eminent Corresponding Member of our Society, of Huguenot descent, was born in the State of Virginia, on the 14th of January, 1806. At the age of nineteen he received an appointment as midshipman in the United States Navy, and in 1834 his first work, 'Maury's Navigation,' appeared, which was at once accepted as a text-book in the Navy of that country.

In 1837 he was promoted to the rank of lieutenant, and shortly afterwards met with the accident through which he was lamed for life. Being thus unable to perform the active duties of his profession, he devoted himself to advance its progress by Essays, some of which contributed greatly towards the establishment of a naval academy. In 1842 he was appointed Superintendent of the Depôt of Charts and Instruments at Washington, when he at once commenced that task of unravelling the winds and currents of the ocean, and measuring its depths, which has rendered his name so famous throughout the world.

The charts and sailing directions published by him shortened the passage to California by 30 days; to Australia, by 20 days; and to Rio Janeiro, by 10 days. They led to the Meteorological Conference at Brussels, when a system of general observation on meteorology and hydrography was agreed to and afterwards adopted by the civilised world.

The illustrious Humboldt declared him to be the founder of a new science, and every commercial country acknowledged the value of those services which, in general terms, may be said to have reduced the period of transit across the ocean one-fourth. The results of his labours and investigations were given to the world in his well-known work, 'The Physical Geography of the Sea,' which has been translated into the languages of France, Germany, Holland, Norway, Spain, and Italy. As a thorough practical man, all his labours had for their main object the security and economy of time in navigation.

Occupying a highly responsible position in the service of his country, he did not hesitate when his State, Virginia, seceding from the Union, called upon him for his services, to resign his position in

the Federal navy. We, gentlemen, have nothing to do with that great struggle; but we may rest assured that the pain of severance from the Union was greatly enhanced by the feeling that in so doing he in a great measure had to abandon the labour of his life.

This resignation led to his residence in this country for a considerable period, and we had consequently the advantage of hearing his opinion at several meetings of this Society, and opportunity was taken to pay a tribute to his services in the furtherance of navigation by a public dinner. The University of Cambridge conferred upon him the degree of LL.D., and the Emperor Napoleon invited him to the Superintendency of the Observatory at Paris. He preferred, however, when the war was over, to accept the Chair of Physics in the Virginia Military Institute; here, surrounded by his family and friends, he displayed the same vigour and energy which had characterised his whole life, and he so gained the confidence and kind feeling of the Academic Board that, when it pleased God, on the 1st of February, 1873, to remove him from this world, it was ordered that the library-hall of the Institute should be draped in mourning for thirty days.

There is a feeling abroad that one who has done so much for navigation and commerce should not be allowed to pass away without an acknowledgment from this generation, which has benefited so greatly by his labours; and it is proposed to hand down his memory by a monument similar to that which was erected to the memory of Horsburgh. It is hoped, therefore, that an international lighthouse may be established, which will by its name convey to future ages the estimation in which the services of Commodore Mathew Fontaine Maury were held.

P. M. G. VAN DER MAELEN, another of our Honorary Corresponding Members whose loss we have to lament, was a distinguished Belgian geographer, known as the founder of the *Établissement géographique* of Brussels, which dated from the year 1830, and to the management of which he devoted all his talent and energy. Like our own Arrowsmith, the maps and atlases he produced in the course of a long and industrious life are too numerous to specify. His first great work was the 'Atlas Universel,' in six volumes, which appeared in 1827; quickly followed by his second, the 'Atlas de l'Europe,' containing 165 maps, which was published in 1829. These two works met with great success, and obtained for him a European reputation as a cartographer.

The Royal Academy of Belgium admitted him as a member in 1829, and medals were decreed him by the Société de Statistique universelle of Paris and the Société des Lettres et Sciences du Tibre in 1830 and in 1831. During the years 1831–8 appeared in succession the eight volumes of his 'Dictionnaires géographiques des Provinces d'Anvers, des deux Flanders, du Hainaut, de Namur, de Liège, du Limbourg et du Luxembourg.' Van der Maelen remained in full activity almost to the last day of his long and successful life. At seventy-four years he pursued his daily routine with the same vigour and regularity as he had done throughout. Indeed he was at that time occupied on one of his larger works, a new map of Belgium on a large scale, and in twenty sheets. This work he did not live to complete. He was seized with an intestinal inflammation, which carried him off on the 29th of May, 1869.

Joaquim José da Costa de Macedo was the son of Agostinho José da Costa de Macedo, a distinguished professor of philosophy, and was born in Lisbon in the year 1777.

Senhor Macedo held the post of perpetual secretary to the Royal Academy of Sciences of Lisbon. He was a Councillor of the King of Portugal and a Gentleman of the Royal Household. In 1856 he was invested in the high office of *Guarda Mór de Real Archivo*, equivalent to our Master of the Rolls.

Retired from active service, he died on the 15th of March, 1867, in the village of Gollegã (district of Santarem), in the 90th year of his age.

Besides his speeches at the Royal Academy of Lisbon, which have been published in the collections of that scientific body, he was the author of the following works:—'Contributions to the History of the Voyages and Discoveries of the Portuguese. 1819.' 'Additions to the above mentioned. 1835.' 'A Memoir, in which it is intended to prove that the Canary Islands were unknown to the Arabs before the Portuguese. 1843.' 'On the state of Arabian Navigation in the time nearest to Islamism, and on the Arab Invasion of Spain. 1849.' 'A Memoir on the Place from whence the Religious Doctrines of Paganism were spread through Asia. 1849.' 'On the knowledge of the Greek Language, and of its Literature in Portugal, to the end of the reign of D. Duarte. 1854.'

This eminent Portuguese *savant* was elected Honorary Corresponding Member of our Society in 1863.

Fernando da Costa Leal, one of our Honorary Corresponding Members, was born at Oporto in 1825. He was the son of

Fernando da Costa Leal, Lieutenant-General in the Portuguese Army.

After concluding his studies in the Royal Military College, he entered the infantry arm of the service in August 1842. In 1853 he reached the rank of captain, and was appointed aide-de-camp to the Governor-General of Angola. In 1856 he was appointed Governor of Mossamedes (Little Fish Bay), in South-West Africa, a post which he filled until 1859, and to which he was re-appointed in 1862, having served in the meantime in Angola as lieutenant-colonel of the garrison. In 1868 he was appointed Governor-General of Mozambique, where he died, eight months after he had taken possession of his governorship, on the 29th December, 1869, in the 44th year of his age, mourned by all who were acquainted with his virtues and noble character. His name, owing to his great ability and integrity, must be quoted among the most worthy functionaries of the Portuguese colonies. He was a Councillor of His Most Faithful Majesty, an officer of the Most Noble Order of the Tower and Sword, and a knight of the Order of S. Bento de Aviz, and of Our Lady of the Conception of Villa Vicosa.

The map of Angola, published in Lisbon in 1863, on a large scale (two sheets), and subsequently (1864 and 1870) on a smaller scale, was drawn by the Marquis de Sa' da Bandèira, conjointly with Senhor Fernando da Costa Leal.

In the 'Annaes do Conselho Ultramarino' may be found several interesting reports on Mossamedes, sent by this distinguished Portuguese officer to his Government.

REV. ADAM SEDGWICK.—By the death of this eminent geologist, one of the original members of our Society, and for many years a fellow-worker in his special branch of science with our late President, Sir Roderick Murchison, our Society has sustained one of its severest losses during the past year.

Professor Sedgwick was born on the 22nd of March, 1785, at Dent, in Yorkshire, his father being at the time vicar of the parish, and a man of much local influence. In 1804 he entered at Trinity College, Cambridge, where he took his bachelor's degree in 1808, classing as fifth Wrangler. In 1810 he was elected to a Fellowship of his college, and in 1818 was chosen to fill the Chair of Geology founded by Dr. John Woodward. He was ordained in the same year, and was also elected a Fellow of the Royal Society. It is recorded that his knowledge of geology at the time of entering on the duties of the Woodwardian Professorship was of the most scanty descrip-

tion; but he applied himself conscientiously and energetically to study, both in the field and in the closet, and so effectively that in two years we find him communicating to the Cambridge Philosophical Society a paper on the physical structure of Devonshire and Cornwall. In the early years of his Professorship he employed his winters in study at Paris, where he benefited by the instructions and acquired the friendship of Cuvier and Blainville. The first paper which he published in conjunction with Sir Roderick Murchison was "On the Structure and Relations of the Deposits contained between the Primary Rocks and the Oolitic Series in the North of Scotland," and bears the date of 1828. Others followed in succession in the years from 1831 to 1842; some of them on the geology of different parts of Continental Europe which he visited in company with Sir Roderick during this period. In 1829 Sedgwick was elected President of the Geological Society, and in 1833 was President of the British Association, which met that year in Cambridge. In 1871, after half a century of successful labour, he resigned his professorial chair.

It is not the place here to dilate on Sedgwick's labours as a geologist, or to enter into the controversy in which he was engaged in the later years of his life, with Murchison and others, regarding the limits of the Cambrian and Silurian systems. It is sufficient to state that he was one of those vigorous workers at this comparatively early stage of the science who established the principles on which Geology as a science must rest; and he was equally eloquent and forcible as a speaker and as a writer.

He died on the 27th of January, 1873, in the 88th year of his age.

Mr. John Arrowsmith.—This eminent geographer was the last of a family which has held the foremost rank in our science for a great portion of a century, and was one of the few remaining Fellows who aided in establishing our Society in 1830. Since that period he has been familiarly known to most of us, and in 1862 he received our Patron's Gold Medal for the very important services he had rendered to Geographical Science. He belonged to an old family in the southern part of Durham, and was born on a farm at Winston, a picturesque village on the banks of the Tees, 6 miles east of Barnard Castle, on April 23, 1790; he died in Hereford Square, Old Brompton, May 2, 1873, having just completed his 83rd year.

He received but an imperfect education, and came to London February 14, 1810, to join his uncle, Aaron Arrowsmith (who was

a native of the same locality as himself), and who had then attained great distinction as a geographer. Aaron Arrowsmith, senior, commenced his career with Mr. Faden, at a period when geographical discovery was so vigorously pursued at the end of the last century, and John Arrowsmith aided his uncle in the production of very many noble maps and charts, which were given on a scale almost unknown in modern cartography. His uncle died in Soho Square in 1822, and was succeeded by his sons, Aaron and Samuel. Aaron Arrowsmith, junior, constructed the well-known Eton Atlas of Comparative Geography, but soon left the profession and graduated at Magdalen College, Oxford. While there, he drew the maps of the once popular Bible Atlas, which was published under his brother Samuel's name. He took holy orders, and died about 1861.

John Arrowsmith, soon after his uncle's death, left his cousins and commenced his excellent London Atlas. After several years of unremitting toil, during which he lived with the utmost frugality, the first edition was published in 1834. It is reviewed in the 'Journal of the Royal Geographical Society,' vol. iv. p. 320. This fine work at once established his fame. He subsequently greatly extended this atlas, and also produced a very large number of other important works. It is only by a retrospect that we can judge of the extent of his labours, and there is scarcely a map now extant that does not bear the impress of his patient toil in the collection and arrangement of materials, often most crude and discordant, to show the progress of discovery. Thus the first work he performed for our Society was a map of the journeys (up to 1832) of his friend, Captain Sturt, our Medallist, in Southern Australia. The results of this exploration, which traced the course of the Murrumbidgee and Murray rivers to the sea, decided to a great degree the controversy which then raged as to whether the interior of Australia was a vast inland sea or a burning desert. How steadily Mr. Arrowsmith worked with the materials which subsequently flowed in is shown by the present maps of Australia, now almost covered by travellers' routes, and which owe their present form very much to his views. He has left some very fine and elaborate maps of each of the great Australian colonies unfinished, and awaiting the perfection he wished for, but could never attain. The second map he executed for the Society was the one drawn by our respected Medallist, Sir George (then Captain) Back, of his terrible journey on an errand of mercy to the Arctic Sea, down the Great Fish or Back River, in 1833-4. This was the commencement of that noble series of enterprises which

afforded our geographer for many years an ample field for his powers, and these were fully occupied on all the northern countries between the Atlantic and Pacific Oceans.

His cousin Samuel died in 1839, and he then purchased a part of the collection made by his uncle Aaron, together with the house, No. 10, Soho Square, where he lived till 1861, at which date he gave up his more active occupations. While living there, he worked earnestly and conscientiously on African discovery for his friend Dr. Livingstone, while that prince of travellers was encountering and surmounting difficulties, till then unheard of.

To enumerate the various works on which he has been engaged would form a long list, and very many of them are still unpublished. It may be affirmed that no man arrived at higher excellence in cartography, or bestowed more care or patience in endeavouring to attain it; no man was actuated by a more earnest spirit in his profession, which he pursued, without regard to emolument, to the last day of his long life.

Sir George Pollock.—The late Field-Marshal Sir George Pollock, G.C.B., had been for twenty years one of our associates, and in 1856–7 served as Member of Council. This distinguished officer was the son of Mr. David Pollock, a Westminster tradesman, and was born in 1786, the youngest of three brothers, all of whom rose to eminence in their respective professions. He is recorded to have received his early education at the Woolwich Academy; and as early as the year 1802, when scarcely 18 years of age, he commenced his military career as Cadet in the East India Company's service. He obtained his commission as Lieutenant in the Royal Artillery in time to take a conspicuous part in the brilliant campaigns of Lake and Wellesley in the years succeeding 1803. He was present at the storm and capture of Dieg; and gained distinction in the trenches of Bhurtpore in 1805. At the close of the same year he was selected by Lord Lake to command the Artillery with the detachment under Colonel Ball, which was sent in pursuit of Holkar. In 1818 he was appointed Brigade-Major, and in 1824 Lieutenant-Colonel. In the last-mentioned year he was nominated by Sir Edward Paget to command the Bengal Artillery attached to the force under Sir Archibald Campbell, and served with great distinction in this capacity throughout the Burmese campaign. From this time his reputation was established as one of the best officers in the service.

It was in the memorable Afghanistan campaign of 1841, how-

ever, that our deceased Associate, now Major-General, came most prominently into public notice. Invested with the command of the forces west of the Indus, his task was to force the Khyber Pass and relieve Sir Robert Sale and his beleaguered army in Jellalabad. The way in which he accomplished this great feat of arms, deemed by so many authorities at the time all but impossible, is a matter of history too well known to need repetition here. For this service he was rewarded by being nominated Knight Grand Cross of the Order of the Bath, and by a formal vote of thanks from both Houses of Parliament, besides a pension of 1000*l.* by the Board of Directors of the East India Company.

On his return to England he was appointed by the Crown one of the Directors of the East India Company. He was also decorated with the Knighthood of the Star of India, and on the death, in 1871, of Sir John Burgoyne, received the appointment of Constable of the Tower of London. Thus honoured and respected, the last years of his long life were spent in well-earned repose. He died on the 6th of October last, and was buried in Westminster Abbey.

GENERAL CHARLES RICHARD FOX was the son of the third Lord Holland, and grand-nephew of the celebrated statesman Charles James Fox. He was born in 1796, and entered the Navy in 1809, in which profession he served till 1813, having been present at the siege of Cadiz in 1810 and that of Tarragona in 1813. In June 1815 he entered the Army as Ensign in the 85th Foot, and between that date and 1865 he passed through the various grades of rank to that of General, which he attained in September of the latter-mentioned year. In 1824 he served at the Cape of Good Hope, during which time he made a tour into Caffre Land, of which he has left in MS. a detailed and interesting narrative in which he describes his interview with the celebrated chief "Gaika." In June 1824 he married Mary Fitz-Clarence, second daughter of the Duke of Clarence (who was raised to the rank of a Marquis's daughter in May 1831).

Lady Mary Fox died in 1864; and General Fox subsequently married Katherine, second daughter of the late Mr. John Maberley, M.P. He died in April of this year, at the age of 76, after a tedious and protracted illness.

Our deceased associate was one of the original members of the Society, and always took an interest in its proceedings. He served on the Council in the years 1836-8, and again in 1860-1, and 1864.

He may be said from his earliest years to have been an active and enterprising traveller. In his childhood and youth he accompanied his father and mother in tours through Spain, Portugal, France, Switzerland, and Italy; from 1818 to 1820 he was in the Levant; in 1832 at the Cape of Good Hope,

Between 1822 and 1830 he visited Malta, France, Holland, Belgium, the Rhine, and Nova Scotia. Between 1830 and 1860 he was constantly travelling in Europe; and in 1865 he went once more to the East, visiting Smyrna, Cyprus, and Syria.

He was, as all travellers should be, an industrious taker of notes, and his long series of private journals, commencing in 1802, when he first travelled in Spain (being then only six years old), and continuing from that date with hardly a break through every year of the present century up to 1872, show with what diligence and intelligence he took advantage of every opportunity to gather information about foreign countries.

The journals kept during his tours in Greece and Asia Minor, and at the Cape, are particularly interesting read at this distance of time; and throughout these diaries many facts and observations are noted which are now much more valuable than the writer believed them to be at the time.

The same remarks may be applied to those parts of his journals which relate to his home life. He had from his youth great social advantages, and he turned these advantages to good account. At Holland House, in his father's lifetime, was to be found a gathering of men distinguished in politics, literature, and wit, such as it would have been difficult to meet with elsewhere in London; and his constant coutact with this intellectual and refined society has enriched his journals with many curious anecdotes and remarks.

General Fox was well known to numismatists as a collector of Greek coins. His cabinet contains a most choice and rare collection, in the arrangement of which he has shown the same patient diligence and love of recording facts which distinguish his journals. Though the collection consists of many thousands of pieces, the history and provenance of each coin is noted wherever it could be ascertained; a practice which, if it were more generally followed by collectors, would greatly lead to the advancement of numismatic science.

In 1856 General Fox published engravings of unedited or rare Greek coins in his collection, Part 1; Part 2 of which followed in

1862. It is to be regretted that he did not continue this useful publication, the engravings in which are admirably executed.

Few of the Fellows of this Society were better known or more generally beloved and esteemed than General Fox; he was warm and constant in his friendship, full of charity and consideration for the failings and misfortunes of others, and ever ready with a kind word or deed to help those who seemed abandoned or forgotten by the busy world.

His conversation, full of quaint racy humour, and anecdotes drawn from the stores of his varied experience, had a peculiar charm from its freshness and vivacity, and still more from the thorough honesty and sincerity which marked every utterance of his mind. He had too real a conviction of the value and power of truth ever to stoop to dissimulation, and of him it might be truly said that his nature was incapable of guile.

COLONEL WILLIAM HENRY SYKES.—This well-known Indian officer and public man, who died soon after our last anniversary, namely, on the 16th of June, 1872, had served on several occasions on the Council of our Society; first in 1851, and again in 1855 and in 1860–1. He also contributed a paper to our Journal, vol. viii. (1838), "On the Use of Common Thermometers in Measuring Heights," which was reprinted in 1854 as portion of the pamphlet 'Hints to Travellers,' which is compiled and edited by a Committee of our Council. The late Colonel Sykes was born in 1790; entering the Indian Army in 1804, he was engaged in active service through the years 1804 to 1818. After that, till he finally quitted India in 1831, he was employed as Statistical Reporter to the Government of Bombay. In 1840 he was elected to a seat at the Board of Directors of the East India Company. He represented Aberdeen in Parliament from 1857 to his death.

SIR DONALD FRIELL MCLEOD, whose death by an accident at a railway station on the 28th of November last attracted so much public attention, was a well-known and much esteemed Indian statesman, having held, during the later years of his career in India, the post of Lieutenant-Governor of the Punjab. He was born in India in 1810, his father being the late General McLeod, of the Bengal Engineers, and his grandfather, Donald McLeod, a Scottish laird of Ross-shire. According to custom he was sent home to be educated, not, however, at so early an age as to prevent him from acquiring the rare accomplishment of speaking the native language with faultless idiom and pronunciation, a circumstance which had much to do with

his after success in dealing with British and native interests at critical periods of Indian history. He returned to India in 1826, and retired from service in 1870. So liberal had he been throughout life in his hospitality and in his donations to charitable objects that he had little beyond his pension when he finally settled in England. He married, in 1854, the daughter of Sir Robert Montgomery, but left no family. We had the honour to enrol him as one of our Associates soon after his return to England, in 1871, and he was a constant attendant at our evening meetings.

Captain H. B. Lynch.—By the death of Captain Henry Blosse Lynch, of the late Indian Navy, Companion of the Bath and Knight of the Lion and Sun of the 1st class of Persia, Her Majesty's service loses a meritorious officer, and the Royal Geographical Society an old and distinguished member. He died at Paris, on the 14th of April last.

Of a good old Irish stock—the Lynches of Castle Carra, county Mayo—he succeeded to the family estate of Partry as the eldest surviving son of Major Henry Blosse Lynch, who served in the expedition to Holland and in the campaigns of the Peninsula, and who, at the storming of Ciudad Rodrigo, in command of the advanced guard of Pack's brigade, received honourable mention in the Wellington Despatches for having made all opposed to him prisoners. Other members of the family followed a similar career, and, though the services of the subject of our notice were on a different field, they were characterised by the same ardour and devotion.

He began his professional career at an early age, in 1823, when he was employed on the surveys of the Persian Gulf. Having classical tastes and a love for languages, neither the climate nor the confined space in the ill-conditioned ships of the day deterred him from applying closely to their study. Having obtained his commission as lieutenant, he was appointed Arabic and Persian interpreter to the squadron in the Persian Gulf, where (till 1832) he was greatly trusted in conducting affairs with the independent Arab chiefs, and in examining the means of communication between the Gulf and the countries on either hand, under orders from H.M. Envoy in Persia. Next he is to be traced as a passenger to Europe in the feat of crossing the Nubian Desert, on the northern limit of Abyssinia, to the Nile and Egypt, after a perilous shipwreck in the Red Sea. In 1834, nominated by the Crown as second in command in Chesney's Expedition to the Euphrates, and subsequently by

the Indian Government as chief of an armed flotilla on the rivers of Mesopotamia, we find him up to 1842 engaged in extending our geographical knowlege of the great rivers, and in successful efforts to promote postal and commercial intercourse between India and Europe by these routes. In 1842, in a time prolific of wars, he was charged with a command, off the Indus, to keep up communications with the army of General Sir Charles Napier in Scinde. From that period to 1851 his duties were of a civil nature as Assistant to the Commander-in-Chief of the Indian Navy, and for a term he officiated for that functionary during his absence in England; he was also a member of the Oriental Examination Committee of Bombay. War with Burmah, in 1851, saw him in command of a squadron of steam frigates in the Irrawady, engaged till 1853 in all the operations against the enemy. For these services he was created a Companion of the Bath at the close of the war. Retiring, after an active service in India of 30 years, he took up his residence in Paris, where his great personal influence and experience enabled him to render further good service in the negotiations conducted there for concluding a treaty of peace with Persia in 1857.

In speaking of his professional usefulness, Henry Blosse Lynch is justly characterised in Markham's 'Memoir on the Indian Surveys,' "as an excellent observer and daring explorer;" for of the same school of officers as Welsted, Ormsby, and Wybard, he personally traversed many of the wildest regions of Asia, as the phrase goes, "with his life constantly in his hand." He was even more gifted than them as a scholar and linguist, and in having those rare qualities of geniality, tact, and temper, which command the respect of the wildest, and win the less barbarous, Orientals. Geographical science, indeed, is indebted to such men as Lynch for its most useful data; for, both in his published official reports, and the 'Journal' of our Society, we find the maps and papers connected with his name conveying the soundest information. Happily, he lived to witness the extended commercial intercourse between Mesopotamia and the adjoining countries, with Europe on the one hand and with India on the other, which he had striven so well to initiate. As a Fellow of our Society of 36 years' standing, the absence of his well-known face will leave a void amongst us not readily refilled. Of the gap beyond, in the circle of his immediate relations and friends, it is hard to speak. Our deepest sympathy, however, is with them.

CHARLES WHITE.—The late Mr. Charles White, Justice of the

Peace for the county of Middlesex and city of Westminster, was for many years one of the most regular attendants at our evening meetings. He took an active interest in the Society's affairs, especially in all that related to financial transactions and social gatherings, and his genial character endeared him to a large circle of friends. He served for three years on the Council of the Society, and fulfilled, with much assiduity, his duties as member of the Financial Committee, which holds monthly meetings throughout the year, and entails no little labour on the gentlemen who compose it. In the prolonged negotiations connected with the purchase of the freehold house we now occupy, he took much interest. He took a pleasure, in the later years of his long and honourable life, in the promotion of works of benevolence and utility, and in associating with those who were engaged in scientific pursuits. As a magistrate he was held in so much respect by those who had the best opportunity of judging, that the Assistant Judge at the Middlesex Sessions, Sir W. H. Bodkin, addressed the Court, after the Grand Jury had been charged, on the subject of the loss the Bench had sustained by his decease, speaking in high terms of his good sense, judicial merits, and humanity.

He died on the 18th of February, at the ripe old age of eighty years.

R. W. Keate.—His Excellency Robert W. Keate, Governor-in-Chief of the West African Settlements, died at Cape Coast Castle on the 17th March, in his 59th year. The position of affairs at the Gold Coast called Mr. Keate to that place, immediately on his arrival in West Africa to assume the government, and he succumbed, after three days' illness, to the local fever.

Mr. Keate, who was born in 1814, was the second son of the late Mr. R. Keate, Serjeant-Surgeon to Her Majesty, and Inspector-General of Army Hospitals. He was educated at Eton and at Christchurch, Oxford. He was called to the Bar in 1844, appointed Civil Commissioner to the Seychelles Islands in 1849, Lieutenant-Governor of Grenada 1853, Governor and Commander-in-Chief of Trinidad 1856, Governor of Natal 1867, and Governor-in-Chief of the West African Settlements 1872.

He married in 1860 Henrietta Jemima, fourth daugnter of Dr. Murray, of Woodbrook, Trinidad, and leaves issue two sons and two daughters.

Mr. Nathaniel Beardmore, member of the Institute of Civil Engineers, was born at Nottingham in 1816. From his earliest youth he evinced a taste for engineering. He served his articles

for five years to the late Mr. J. M. Rendel, whom he left in 1839, and commenced business for himself. Soon after, however, he became Mr. Rendel's partner, with whom he worked for some years. In 1846-48 he took an active part with Mr. Rendel and others in the construction of the Edinburgh Water-works, and was connected with the supply of water to many of the large towns in the North of England.

Hydrological questions were his speciality, and he has given to the world, as the result of many years of careful study and laborious research, his well-known book the 'Manual of Hydrology.' This work, in addition to some purely technical tables, which were originally published in 1850 as a separate volume, entitled 'Hydraulic Tables,' contains much valuable and admirably condensed information on the subject of tides, rainfall, and evaporation, with a description of many well-known rivers. This part of the book is illustrated with plans and sections of the rivers Thames, Avon, Severn, Po, Adige, Reno, Seine, Tiber, Nile, Hooghly, and Ganges.

By careful reading and the observations he obtained of the rainfall in mountainous districts, and the flow of rivers in almost every part of the world, he acquired a surprising knowledge of different countries; and from his conversation he was often supposed to be a great traveller. It is related that once, when at dinner, the conversation relating to the Himalaya, an old Indian officer who was very familiar with that part of the country turned to him and said, "Then you also have been there."

For upwards of twenty years Mr. Beardmore was engineer to the River Lee, in Hertfordshire; the new works under the Act of 1851 were carried out according to his plans and designs, and he vastly improved the navigation. He was much engaged on the River Thames, having, since the passing of the Thames Navigation Act of 1866, acted as consulting engineer to the Conservancy Board.

His opinion was much sought for on water questions abroad as well as at home. His sound judgment and clear head rendered him able in reporting on hydraulic questions, and in giving evidence, which he frequently did in arbitration cases and trials at law.

He reported on various extensive works to the Public Works Loan Commissioners, and gave important evidence before the Royal Commissioners appointed to inquire into the water supply to London and other large towns, and also before that appointed to investigate the best means for preventing the pollution of rivers.

He had enjoyed comparatively good health up to about two years

before his death, but then the continual strain of mental exertion began to tell upon the physical frame, and he died on August 24th, 1872, in the 57th year of his age, after an attack of congestion of the lungs, from which he had not strength to rally in his then enfeebled state of health.

He was high-minded, generous, and unselfish. In his professional career his activity was remarkable, and his life was one of eminent industry and usefulness. He took a high standing among his brother engineers. Possessed of an enthusiastic love for his profession, of an untiring zeal and perseverance, together with genuine goodness and friendly sympathy, he has left a large circle of friends to mourn his loss.

Our losses by death during the year include also the following gentlemen:—Mr. T. Graves Archer, Mr. T. R. Auld, Mr. J. E. Anderdon, Sir David Baxter, Bart., Viscount Boyne, Mr. J. Brenchley, Mr. J. P. Brown, Mr. G. F. Chambers, Mr. J. Chapman, Sir W. N. Clavering, Bart., Mr. J. Cubitt, Mr. A. Grant, Admiral the Hon. J. Gordon, Mr. T. Gillespy, Mr. R. W. Grenfell, Mr. J. A. Guthrie, Mr. J. Hollingsworth, Mr. W. S. Hale, Mr. Charles Horne (a retired member of the Indian Civil Service, who had attracted some notice by his writings on Natural History), Dr. W. C. Hood, Mr. J. Hunt, Mr. T. Lee, Major-General Sir E. Macarthur, Major W. Montagu, Mr. W. Morgan, Major-General L. S. O'Connor, Mr. J. Power, Mr. F. Pike, Mr. A. S. Petrie, Mr. J. E. C. Pryce, Rev. T. O. Short, the Hon. Edward Stirling, Mr. H. Sterry, Mr. John Walker (cartographer to the India Office, and in 1852–3 member of our Council), Captain J. Walmsley, Captain W. M. Wolfe, Captain Sir W. H. Walker, Mr. James Walker, Mr. H. C. Walton.

Admiralty Surveys.*

The following is a brief account of the surveying operations which have been carried out by the Admiralty during the past year.

On the East Coast of England.—The *Porcupine*, under Staff-Commander John Parsons, has been employed chiefly on the Essex and Suffolk coasts. A complete re-survey of the port of Harwich has been made, rendered necessary by considerable changes in the depths, produced both by natural and artificial

* By Admiral G. H. Richards, Hydrographer to the Admiralty.

causes. In the neighbourhood of Yarmouth and Lowestoft, where changes are constantly in progress, fresh surveys have been made; some of the banks were found to have moved materially to the southward, and what had until lately been a principal channel was closed up to navigation.

The survey was then carried south between Orfordness and the Naze, and is now in progress.

West Coast of England.—The *Lightning*, which had been for some years employed on surveying service, was found no longer seaworthy, and broken up; no vessel being yet available to take her place, the surveying party, under Staff-Commander J. H. Kerr, have been during the past year employed with boats in making a re-survey of Menai Straits and the neighbouring shores of Carnarvonshire, where considerable changes were found to have taken place since the last survey made in 1837.

Portsmouth.—This survey, which is principally connected with the deepening of the entrance to Portsmouth Harbour and with the examination of Spithead and the banks of the Solent, continues to be carried on in a steam launch by a small party under the direction of Staff-Commander D. Hall, and much accurate and useful work has been completed during the last season, including a re-survey of the harbour of Portland on a large scale, and an examination of Southampton Water.

Mediterranean.—This survey is still carried on in H.M.S. *Shearwater*. It was stated in the last report that, by dint of great exertions on the part of Captain Nares and his officers, an elaborate survey had been completed of the Gulf of Suez and a portion of the Red Sea. This work has lately been published by the Admiralty. The re-survey of Port Said and its approaches was also completed by Captain Nares during the past year. This officer having been appointed to the *Challenger*, was superseded, in April of last year, by Commander Wharton, who is now conducting the survey. In June last he left Malta to complete the examination of the Dardanelles, which, together with the narrow western portion of the Sea of Marmora for 25 miles eastward of Gallipoli, was finished by the end of October. During this survey some very complete and interesting experiments were made on the currents both in the Dardanelles and Bosphorus, which proved the existence of strong under-currents running counter to the almost invariable surface set from the Black Sea through both these straits into the Mediterranean. The details of these experiments, with illustrations, are in course of publication

by the Admiralty. A survey was next made of the roadstead of Dédé Agatch, the terminus of the railway from Adrianople.

In January the *Shearwater* visited Cape Bon, on the coast of Tunis, to select the site of a new light-house, which has long been required there, and for which the British Government are supplying the lighting apparatus; subsequently she resumed the survey of the coast of Sicily, and is now about to proceed on a re-examination of Port Said and its approaches.

Japan.—The *Sylvia*, Commander St. John, has been actively employed on the examination of these coasts during the past year. The season commenced with a survey of Goza Harbour, Muro Bay, and the coast and off-lying dangers in the neighbourhood of Cape Sima, on the east side of Nipon; subsequently Susaki and Nomi harbours, on the south coast of Sikok, were surveyed; these ports afford good shelter and serve as harbours of refuge for vessels when caught off the coast in heavy weather. The Baunga channel has been partially sounded, the anchorage off the island of Uimi Sima and the adjacent coast examined, and the eastern part of the Strait of Simonoseki re-sounded. In the latter part of August the *Sylvia*, having been several years in Japan, and requiring repairs and new boilers, was ordered to England. On her voyage she carried a line of deep soundings for telegraphic purposes from the entrance of the Gulf of Aden to the Seychelles, thence to Mauritius and Natal on the eastern coast of Africa, the depth of water on these lines varying from 2200 to 2500 fathoms. The ship arrived in England in April, and was put out of commission after one of the most successful surveying voyages on record. She will be thoroughly refitted, and it is hoped, at no distant date, will resume her labours in Japan.

The Eastern Archipelago.—The *Nassau*, Commander Chimmo, has likewise just returned after an absence of something under three years; she had been employed during 1872 principally among the Sulu Archipelago, and in clearing away the dangers of the Sulu Sea. Many difficulties were met with which impeded the progress of this work, among them the hostility of the piratical tribes which infest these regions, and which obliged the parties to be always armed and on the look-out; on a late occasion one of the boats was attacked, and some of the officers and crew wounded, in return for which their town was destroyed and severe punishment inflicted upon the pirates. The *Nassau* returned to Singapore by the Flores and Java seas, examining the various dangers in the track of

vessels by that route to Australia; she reached Malta by the Suez Canal in March, when she was put out of commission and is now being prepared for further surveying service on the eastern coast of Africa.

Cape of Good Hope.—This survey has been completed as far as circumstances will admit; the soundings which are still required to render it perfect will be obtained as opportunities offer. Navigating-Lieutenant Archdeacon and his assistant have been transferred to Western Australia, the survey of which has been commenced.

West Indies.—During the season of 1872, Staff-Commander George Stanley and his two assistants, with a hired schooner, have completed the survey of the Island of Dominica, and carried the soundings beyond the 100-fathom line. During September the Windward Islands were visited by a severe storm, when every vessel lying in the roadstead of Dominica, including the surveying schooner, was driven ashore. The latter was totally wrecked and several lives lost. The surveying party have proceeded with another vessel to Jamaica, which important island has long required a thoroughly good survey, and which it is hoped will now be carried out to its completion.

Newfoundland.—Navigating-Lieutenant Maxwell, who is in charge of this survey, has with his two assistants in a small hired steamer, completed the examination of Trinity Bay, and has commenced that of the south coast of the colony at the Burgeo Islands, completing the coast for a considerable distance to the eastward. Soundings have also been obtained in the neighbourhood of Sable Island. The accurate survey of the south coast of Newfoundland, indicating as it does the safe approach to the several harbours of refuge, is of great importance to the increasing trade with the River St. Lawrence.

Queensland.—Staff-Commander Bedwell, with one assistant, has during the past year made a minute examination of the Brisbane River, and has also examined the Bar at Wide Bay. The survey of the coast has been extended 50 miles to the north, from Keppel Islands to Cape Clinton.

New South Wales.—The survey of the inner waters of this colony are still in progress by Navigating-Lieutenant Gowland, at the expense of the Colonial Government. During the past season the inner waters of Broken Bay and the course of the Hawkesbury River have been surveyed as far as the flow of the tide.

Victoria.—The surveying party on this coast, under the direction

of Navigating-Lieutenant H. J. Stanley, have been employed during 1872 in completing the sounding of the western coast of the colony, and in the survey of King Island, at the western entrance of Bass Strait; about 120 miles of exposed coast has been examined, and a large area sounded over.

South Australia.—The surveying party in this colony, under the direction of Staff-Commander Howard, were employed during the early part of the last season on the west side of Spencer Gulf; Port Lincoln in the south-west corner of the gulf was surveyed, and the work carried northward to Franklin Harbour, where it joined the survey of 1871. The whole of this extensive gulf is, therefore, now completed. During the latter part of the year, the southern coasts of Kangaroo Island were examined, and the circuit of the island completed.

The extent of coast line examined during the year has been over 200 miles, all of which has been carefully sounded.

Western Australia.—The survey of this colony may be said to have barely commenced, and the difficulty of procuring a suitable vessel in which to prosecute it, will probably for some time render its progress slow.

Navigating-Lieutenant Archdeacon, the officer in charge, reached Fremantle in August last, and at the termination of the boisterous winter season lost no time in commencing the examination of the various passages between the islands and the reefs off the Swan River, in the absence of a vessel, working with boats, the first object being to ascertain whether that spacious sheet of water, known as Cockburn Sound, can be made available for navigation by large vessels.

Deep-Sea Exploring Expedition.—In the last notice of the Hydrographical Surveys it was announced to be the intention of the Admiralty, on the recommendation of the President and Council of the Royal Society, to despatch an expedition for the exploration of the Great Ocean Basins, and for scientific research and discovery generally. This intention has now been realised, and in December last H.M.S. *Challenger*, a frigate-built ship of about 1500 tons, sailed from England under the command of Captain G. S. Nares. In addition to a staff of naval surveyors, there has been attached to her a body of scientific naturalists, under the direction of Professor Wyville Thomson, F.R.S. The ship has been admirably equipped, and no expense has been spared to render her in every respect perfect; she has been abundantly supplied with all the scientific

instruments and apparatus necessary to carry out the physical investigation of the deep sea, and for the collection and preservation of natural history specimens, and fitted with all the mechanical appliances which modern science could suggest, in order to sound and dredge, and obtain temperature and other observations at the greatest depths. On leaving England the *Challenger* proceeded to Lisbon, Gibraltar, Madeira, Teneriffe; thence across the Atlantic to the West Indies, and by the latest accounts had reached Bermuda. Continuous lines of deep soundings and temperature observations had been carried throughout this track, and many interesting discoveries have been made in several branches of natural history. The deepest sounding obtained between the Canary Islands and St. Thomas's in the West Indies was 3150 fathoms.

After exploring the region around Bermuda, the ship will recross the Atlantic to the neighbourhood of Ayres, thence sail southerly to the Cape de Verde, subsequently traversing the equatorial region to Brazil, and the whole of the present year will be passed in the South Atlantic. Departing from the Cape of Good Hope early in 1874, she will visit Kerguelen Island, penetrate to the icy barrier in the south, thence to Australia and New Zealand; Torres Straits, the Malayan Archipelago, the Philippine Islands, and Japan will be successively visited, and the neighbouring seas explored; the Pacific Ocean will then be traversed, and the ship will return to this country, after a voyage of circumnavigation probably extending over three years. Such is briefly the programme laid down, and up to the present time all has gone prosperously and successfully with the *Challenger*. A brief and popular journal of the proceedings of the voyage will be published from time to time by Professor Wyville Thomson in the pages of 'Nature,' as a prelude to the full scientific account of the expedition, which will no doubt appear shortly after its termination.

General Remarks.—In addition to the Hydrographical Surveys which have been executed during the past year by the regular surveying service, a considerable quantity of valuable information has been received from the officers of H.M. ships employed on foreign stations and from others.

It would be difficult to mention every source from which such information has been received, but among the most prominent contributors are Captains John Moresby and C. H. Simpson of H.M. ships *Basilisk* and *Blanche*, and Messrs. T. L. Mourilyan and W. F. A. Grant, Navigating Officers of those ships, also S. T. Leckie, R.N.R.,

commanding one of the Pacific Steam Navigation Company's steamships. The *Blanche* made, in 1872, a six months' cruise among the South Sea Islands, during which time she visited the principal islands in the Caroline, Marshall, Gilbert, and Solomon groups, as well as New Ireland and New Hanover, describing and making plans of several unknown anchorages, these, as well as the nautical remarks accompanying them in reference to these little known regions, have been published for the benefit of seamen.

The *Basilisk* also visited the Ellice Islands, Santa Cruz, and New Hebrides groups, and several detached islands in the western part of the South Pacific, when every opportunity was taken advantage of in collecting useful information, and in making such surveys as the hurried nature of her visits would permit. On other occasions, while visiting the settlement of Somerset, at Cape York, Captain Moresby and his navigating officers have lost no opportunity of adding to and correcting the charts where imperfect. The *Barossa*, Captain Lewis Moore, likewise visited the Marshall and Gilbert islands recently, in search of a shipwrecked crew, and some useful information has been received from Navigating Lieutenant Fenn, of that vessel.

Mr. Leckie, of the Royal Naval Reserve, has long been a valuable contributor to the Hydrographical Department, and has made many essential corrections to the charts, especially to those of the western portions of the Straits of Magellan and the channels leading northward into the Gulf of Pesias; for the great pains he has been at in all his voyages to collect and communicate useful information, his name deserves special mention in this report.

Summary.—The usual Tables of Tides, Lights, and Hydrographical Notices, &c., have been published during the year, as well as the following nautical works, viz., new editions of Sailing Directions for the West Coast of Africa, from Cape Spartel to the River Cameroons, including the Cape Verde Islands, Canaries, and Azores. Directions for the North Sea; a new volume, part 4, for the Northern Coast of China, Corea, Tartary, and Japan; a revision of the Directions for the West Coasts of France, Spain, and Portugal; and a volume of hydrographical remarks, relative to the islands of the Pacific.

Among the 73 new charts which have been engraved and published since the last yearly report, may be specially mentioned a Physical Atlas, showing the Winds, Currents, and other pheno-

mena prevailing in the Pacific, Atlantic, and Indian Oceans, during the different seasons; a chart of the Gulf of Suez; a new series of the Red Sea, in 5 sheets; New Caledonia, in 2 sheets; the Island of Barbados; and a sheet of the Inland Sea of Japan.

More than 1400 sheets have been added to or corrected, and the number of charts printed for the navy and the public during the period has been 158,700.

NEW PUBLICATIONS.—*Petermann's 'Geographische Mittheilungen.'*—The chief feature of the year in this important geographical Journal are the Arctic papers contributed by its editor. They contain the most minute and faithful records of the gradual advance of know ledge from all sides, and from all nationalities, in Arctic Geography.

Most interesting, perhaps, at the present time among the Asiatic papers are those which deal with the journeys of Russian travellers in Eastern and Central Asia. Thus, we have an account of Prjivalsky's travels from Pekin towards the Koko Nor, in Western China; Matusovski's and Palinow's, in Central Mongolia; and of Fedchenko's journey through the Khanate of Kokan to Karategin and the Northern Pamir. The present state of our knowledge of the most northern portion of the Asiatic continent, extending into the Arctic seas between the rivers Lena and Yenisei, and near which the Austrian Polar Expedition of 1872 is believed to have wintered, has been placed in the clearest light by an essay describing and critically examining the results of every journey which has yet been made in the vicinity of the North Cape.

The *Mittheilungen* has also kept us fully alive to the movements of travellers and explorers in all parts of Africa, containing intelligence from Munzinger, in Northern Abyssinia; Ernest Marno, on the Upper Nile; Dr. Schweinfurth, in the basin of the Bahr-el-Ghazal; Dr. Nachtigal, in the countries of Soudan, round Lake Chad; Mauch and others, to the south of the Zambezi; and Hugo Hahn, in Damara Land; whilst the papers by Dr. Behm, which treated of the results of Dr. Livingstone's recent work on the Lualaba, supposed to be the Upper Congo, have been considered so important as to require translation for our own Journal.

In Australia, Gilmore's journeys in search of the remains of the Leichhardt Expedition, which are here carefully recorded and mapped, have done much both to elucidate the movements of that unfortunate traveller and to add to our knowledge of the region which lies westward of the great central line of telegraph.

Professor Mohn, the Director of the Norwegian Meteorological Institute, has contributed a most instructive essay on the results of all the observations for temperature in the deep seas between Greenland, Northern Europe, and Spitzbergen.

M. Emil von Sydow has also continued his admirable descriptions of the progress of European surveys and cartography; this series of papers is of the highest value to the practical geographer, and examples are not wanting of the beneficial effect which the criticisms they contain have exercised on the more recent sheets of the greater and topographical surveys now in progress.

Bruhn's 'Life of Humboldt.'—The scientific biography of Humboldt, the great father of Physical Geography, which has recently been completed, after three years of labour, under the editorship of Professor Bruhns, of Leipzig, demands cordial welcome at our hands. The work was undertaken in the year of the centenary of Humboldt's birth, and the various parts of it which treat of Humboldt's personal life, his travels in America and Asia, and of the varied contributions to many branches of science, have been written by the men best qualified in Germany to deal with each subject; the whole forms the most fitting tribute to the memory of the great philosopher.

Ocean Highways.—This publication has amply fulfilled the promise to which I referred in my last Address, of becoming, under its new editorship, an important Geographical Journal. Since then, articles of great value have appeared in the successive monthly parts, together with numerous original maps—all, as a general rule, referring to geographical subjects of great public interest at the time. Thus, during the summer months of last year, while public attention was powerfully drawn to the subject of Dr. Livingstone's discoveries in Central Africa and to the remarkable exploit of Mr. Stanley, there appeared a valuable sketch-map by Keith Johnston, giving the positions of places mentioned by Livingstone and his routes; and several editorial articles written with great spirit and knowledge of the subject. A map by Ravenstein, delineating the routes and discoveries of Schweinfurth, was also a meritorious and timely publication. There have also appeared several important maps on the countries of Central Asia, translated and popularised from Russian authorities. Such are the map of the country between Krasnovodsk and Khiva from Skobolef; that of the region between the Caspian and the Oxus; and that of Central Asia, which appeared in the August number. Amongst the numerous articles containing valuable geographical information, I may men-

tion also those on Arctic subjects; some of which are illustrated by valuable maps: Grandy's paper on the Congo, with map, in the January number; and Dr. Brandis' article on the distribution of Forests in India, also with a map, in the number for August. Besides these chief contributions, each monthly part contains reviews of books on Geography and Travels, *résumés* of the doings of Geographical Societies at home and abroad, and a great variety of miscellaneous information bearing upon geographical subjects.

Guido Cora's 'Cosmos.'—A new Geographical Magazine, under the title of 'Cosmos,' has been started at Turin by Signor Guido Cora. The first and second parts contain articles on the recent Italian Expedition to New Guinea of Beccari and D'Albertis; on Lake Tanganyika (a useful *résumé* by the editor, with a map, of the various explorations in the basin of this famous African lake); on Russian Possessions in Central and Northern Asia, by Luigi Hugues; on Giles' Journey in Central Australia (with a map) and the Continental Australian Telegraph (also with map), and on the Colonisation of the Island of Yesso (with map). Besides these, each part contains a large number of minor notices. A periodical of this character, so fully up to the mark in these rapidly progressing times, is an encouraging symptom of healthy intellectual life in Italy. The maps at present are only copies or adaptations of others published in England and Germany; but they are favourable specimens of cartographic art, and, together with the copious information given in the text of the progress of Geography in all parts of the world, place in the hands of Italian readers the means of acquiring a knowledge of all that is passing in this department of human activity.

Bollettino della Società geografica italiana.—The eighth volume of the 'Bulletin of the Italian Geographical Society' was published in October, and is the last that has reached us. From the *Compte rendu* of the administrative proceedings of this Society, of the 4th June, 1872, we learn that the distinguished geographer and founder of the Society, the Commendatore Cristoforo Negri, had been replaced in the Presidency by the Commendatore Correnti, and had been invested with the title of Honorary President, with the functions attached to that post of conducting the foreign correspondence. The eighth volume of the 'Bollettino' contains several original memoirs by Italian travellers and writers, besides correspondence and minor notices relating to almost all subjects of current interest in Geography and the allied sciences.

Voyage d'Exploration en Indo-Chine.—Lieutenant Francis Garnier, of the French navy, to whom we gave our Patron's Medal in 1870 for the part he took in the Expedition under Lagrée through Cambodia and Yunnan to the Yang-tsze, has now given to the world the complete narrative of this important journey. As will be remembered, Lieutenant Garnier succeeded to the command on the death of his chief, whom he left in the capital of Yunnan whilst he himself undertook a perilous journey to the head-quarters of the Mahommedan rebels at Tali-fu. The work he has now published is in every way worthy of the splendid undertaking the results of which it is intended to record. It consists of two large quarto volumes of text, illustrated with many hundred wood engravings from drawings made by members of the expedition. Besides these there are two atlases in large folio, one containing 22 sheets of maps and plans, and the other 47 plates, lithographed from drawings made by Lieutenant Delaporte. Some of the plates are coloured, and those especially which depict the colossal ruins of the Cambodian temples of Nakon Vat and Ongcor Vat are very striking. Before the expedition started on its long journey up the Mekong, Captain Lagrée devoted much time to the study of these marvellous ruins. Our library is indebted for a copy of this fine work to Lieutenant Garnier and to the Ministre de la Marine.

Switzerland.—Our much esteemed Corresponding Member, M. J. M. Ziegler, with his usual punctuality, has furnished us with a Report of the Progress of Geography in Switzerland. According to his account the subject most worthy of mention, as in former years, is the continuance of the "Nivellement de Précision," and he furnishes us with a copy of the Proceedings of the 11th sitting of the Swiss Geodetic Commission, which has this work in its charge. The eminent surveyors and physicists, MM. Plantamour, Denzler, and Hirsch, who constituted the Commission at this sitting, have not yet, according to our correspondent, arrived at definite results; but they have satisfactorily determined two points of direct communication with the German levelling—one at Bâle and the other at Constance. The aim of Swiss surveyors has been for several years the attainment of the utmost possible precision in all that relates to the topography of their rugged country, both in its horizontal and its vertical configuration. M. Ziegler himself has contributed in no small degree to this result, by devoting eight years

to the task of fixing the altitudes of the granitic masses forming the eastern pendent to Mont Blanc; the list of which he communicates, and which is well worthy of a place in our 'Proceedings.'

Another of our Swiss Honorary Correspondents, Professor Paul Chaix, has sent us a copy of the General Table of Limnimetric and Meteorological Stations for Switzerland for 1871, and has pointed out in a valuable letter, forwarded at the same time, a few general facts suggested by the results. These comprehend a grouping of districts according to the amount of the yearly rainfall, and a hydrometric summary of the different river-basins and lakes, showing with accuracy the regulating influence of these latter on the drainage of the countries through which the rivers flow. The details are too lengthy to be here given, and will find their proper place in our 'Proceedings.'

Arctic Exploration.—In my Address of last year I announced the despatch of the Swedish Arctic Expedition, with the intention of wintering in Mossel Bay, on the north side of Spitzbergen, and of exploring by means of sledge-parties during the spring of the present year. The expedition consisted of the *Polhem* steamer (commanded by Lieutenant Palander, with Professor Nordenskiold on board), which was to winter; and the brig *Gladan* and steamer *Onkel Adam*, intended to take out supplies and return before the winter set in. Unfortunately the two latter vessels were caught by the ice, and have been forced to winter off Spitzbergen, and it is feared that the necessity for supplying their crews will have the effect of crippling the resources of the *Polhem*. Nevertheless, we may entertain the hope that the gallant Swedes will persevere in their enterprise and do some useful geographical work during the present season. Four fishing-vessels from Norway were also frozen in, and forced to winter off Grey Point, and eighteen men retreated to Ice Sound, on the south-west side of Spitzbergen in open boats. On hearing of these disasters the Norwegian Government immediately chartered the sealing steamer *Albert*, and despatched her, under the command of Captain Otto, with relief, including two wooden houses to be erected on shore for the men in Ice Sound. The *Albert* sailed in November, but was driven back by stormy weather. Then Captain John Kjelson, in the *Isbiorn*, made a gallant attempt to reach Spitzbergen in mid-winter. He sailed from Tromsö on the 24th December, but the extreme cold rendered navigation almost impossible. On the 8th of January the

Isbiorn sighted Bear Island. The vessel was one mass of ice, and this audacious effort to reach Spitzbergen in mid-winter was unwillingly relinquished. Thus the hardy Norwegian fishers, as well as the Swedish explorers, have been obliged to pass a Spitzbergen winter without being relieved. But the spring is now well advanced, and by this time succour must have reached these brave men from Norway.

The Norwegian sealing vessels made some very important discoveries to the eastward of Spitzbergen during July and August of 1872. Captain Altmann and Captain Johnsen, sailing in a north-easterly direction from the Rijk Ys Islands, re-discovered the extensive island which was first discovered by an English ship in 1617, and named Wiche's Land. Captain Nilsen, in the same season, rounded the eastern point of Wiche's Land, and sailed along its northern coast. This re-discovered land, with the tracks of the three Norwegian vessels, have been delineated on a chart by Professor Mohn, of Christiania, to whom geographers owe so much for his exertions in collecting and putting into shape the observations of his adventurous countrymen.

The Austrian Arctic Expedition, under the command of Captain Julius Payer, sailed in June 1872, with the object of rounding the north-eastern end of Novaya Zemlya, and pressing to the eastward through the Polar Sea to the north of Siberia. Captain Payer hopes to be able to explore this sea through the favourable operation of the warm Siberian rivers on the ice-cold Arctic Ocean. He is accompanied by his old comrade Lieutenant Weyprecht, and by the Norwegian explorer Carlsen, the only commander who has circumnavigated both Spitzbergen and Novaya Zemlya. Captain Payer intends to pass his first winter on the shores of Cape Chelyuskin, and if unable to reach Behring Straits in the second season he will abandon his steamer, the *Tegethoff*, and proceed up one of the Siberian rivers. The *Tegethoff* was accompanied as far as Novaya Zemlya by Count Wilizec, in the little *Isbiorn*. The latest news of the *Tegethoff* was from the coast of Novaya Zemlya, when the *Isbiorn* parted company in August. The ability and high qualifications of Captain Payer, as well as his Arctic experience, give every reason for the hope that his efforts will be rewarded by success.

In my Address last year I mentioned the important voyage of Mr. Leigh Smith to the north and east of Spitzbergen, in the summer of 1871, when he reached a latitude of 81° 24′ N. In

1872 this adventurous yachtsman undertook another voyage in his yacht the *Sampson*, but it was an unfavourable season, and no discovery was made. Mr. Leigh Smith is a man who will not be daunted by one failure. He will persevere until a favourable season enables him to do really important work, and this year he has again sailed for Spitzbergen.

The captains of our English whalers, courageous and intelligent men, who yearly brave the dangers of ice navigation, are often led into unvisited regions in the pursuit of whales, and are thus in a position to record useful geographical discoveries, and to furnish the hydrographer with materials for adding to or correcting the Arctic charts. In the season of 1872, Captain Adams, of the *Arctic*, went up Pond's Inlet into Eclipse Sound, and thence, through Navy Board Inlet, into Barrow Strait. He also ascended Admiralty Inlet for a considerable distance, and his discoveries have been inserted on the latest edition of the chart. Captain Gray, of the *Eclipse*, who always goes to the sea on the eastern side of Greenland, reported the existence of an unusual extent of open water in the summer of 1872.

In my Address for 1871-72, I had the pleasure of announcing that the Arctic Committee appointed by our Council had drawn up a Report, which was adopted: and that the unanimity of all Arctic authorities on the route that should be taken by an exploring expedition in the unknown Polar region would enable me to bring the subject of Arctic exploration to the notice of other learned societies, and subsequently to that of the Government. The views of other scientific societies and of eminent men of science, as to the importance of Arctic exploration, coincided with those of our own Council, and I was thus in a position to bring the subject before Her Majesty's Government for favourable consideration. Accordingly, on the 16th of December I had an interview with the Chancellor of the Exchequer and the First Lord of the Admiralty, accompanied by a deputation, consisting of Sir Henry Holland, the President of the Royal Institution; Dr. Carpenter, the President of the British Association; Dr. Hooker, the future President of the Royal Society, and by several eminent Arctic officers. I submitted to the right honourable gentlemen the opinion of our Arctic Committee and the views expressed by several scientific societies with whom I had communicated; and I represented that the collective evidence of these seamen and men of science could leave no doubt with regard to the value and importance of the results which

a well-appointed Arctic expedition, in the direction of Smith Sound, must yield. I also alluded to the way in which Arctic exploration redounded to the national honour and repute; and contributed to keep alive that spirit of courage, enterprise, and self-denial which is so essential to the character of the seamen of a great maritime nation.

Both Mr. Goschen and Mr. Lowe made numerous inquiries respecting the equipment of an Arctic expedition and the scientific results to be attained by it, and, after a very favourable reception, Mr. Lowe concluded the interview by assuring the deputation that the subject should receive careful and mature consideration.

The reply from the Chancellor of the Exchequer, written December 31st, was not so favourable as had been anticipated, although it left room for hope that the Arctic expedition so ardently desired by this Society and the country generally would only be postponed for another year. Mr. Lowe said that there seemed to be no pressing necessity for despatching an expedition this year, and that it would not be right to send out a second scientific expedition precisely at the moment when the public revenue had to bear the burden of fitting out the *Challenger*. In conclusion, Mr. Lowe expressed regret that he could not recommend the sending a Government exploring party to the Arctic Ocean this year.

In my reply, acknowledging the receipt of this letter, dated the 13th of January, 1873, I said that the Council were glad to see that the Chancellor of the Exchequer did not express an opinion as to the expediency of sending an Arctic expedition at a future time: and that we were thus emboldened to hope that the additional arguments in favour of Arctic exploration with which we expect to be fortified, would lead to an expedition being sanctioned later in the present year, which might leave England for Smith Sound in the spring of 1874, and thus furnish a fitting and much needed complement to the scientific voyage of the *Challenger*. The Council of the Royal Society has since appointed a committee to confer with our own Arctic Committee, and steps will thus be taken once more to bring the subject of an Arctic expedition to the notice of the Government in a way which should lead to a satisfactory result. There seems to be good reason to hope that the year 1874 will see the despatch of an exploring expedition to the unknown and most interesting region which lies round our northern pole, through the portal of Smith Sound.

Meanwhile, the Arctic campaign of the present year may be expected to yield good fruit, in spite of the postponement of an English expedition. Payer and Weyprecht are wintering on the Siberian coast, and the Swedes in the north of Spitzbergen. Intelligence has also been received of Mr. Hall's American Arctic Expedition, from a portion of the crew, consisting of twelve men, two women, and five children, picked up in an open boat off the coast of Labrador, and brought into Roberts' Bay, Newfonndland. Their story is, that the *Polaris* went up Smith Sound, as far as 82° 16′, in the summer of 1871, that Mr. Hall made a sledge journey up a strait 15 miles wide, and that he died of apoplexy in November 1871. The command then devolved upon Captain Boddington, the sailing master; and, in August, 1872, the ship is stated to have been beset in 77° 35′, which would be near Whale Sound, in the northern port of Baffin's Bay. The men who have been picked up were carried away by the ice, according to their own statement; and they allege that the *Polaris* is left without boats, but with plenty of provisions. According to this account, Mr. Hall's expedition will have added little or nothing to the discoveries of Kane and Hayes, but it will be useful as furnishing another proof of the necessity for sending out a thoroughly-equipped Government expedition, if really important results are to be obtained from Arctic exploration. Mr. Leigh Smith has sailed again for his old Spitzbergen ground, resolved once more to strive for a passage through the ice, and to achieve some new discovery. In this, his third Arctic voyage, he is provided with a more suitable vessel. The *Diana* is a strong little screw-steamer, built and strengthened expressly for ice navigation, of 103 tons and 50-horse power. Mr. Leigh Smith has an experienced master in Captain Fairweather, and he is accompanied by Mr. Eaton as a naturalist. The yacht *Sampson* goes out as a tender to the *Diana.* The whaling fleet will also bring back valuable information respecting the state of the ice, and, perhaps, make some new discoveries. Captain A. H. Markham, R.N., has sailed with Captain Adams, on board the *Arctic*, for Baffin Bay; and on his return he will report to us the results of the voyage and his observations on the present state of the ice in the direction of the northern sounds. Thus many zealous explorers are now prosecuting researches within the Arctic Circle, and may be expected to furnish us with a large stock of fresh information next autumn, which will be useful to the Arctic Expedition of 1874.

Venetian Voyages to the North in the 14th Century:—The Lost

Greenland Colony—The pre-Columbian Discovery of America.—A paper of considerable importance to historical geography has been presented to the Society by Mr. Major, and will shortly be read at an evening meeting, in which he brings before the notice of the Society two geographical documents, one Venetian, the other Greenlandic, of the close of the fourteenth century. The authenticity of the former had been disputed for three hundred years, and, so late as 1836, had been declared in our own 'Journal' to be a tissue of fiction, by the Danish hydrographer Captain Zahrtmann, in an article so remarkable for its learning and ingenuity as to have carried with it *all but* the force of demonstration, but Mr. Major has answered all Captain Zahrtmann's arguments, and succeeded in establishing the truth of the documents from internal evidence.

The correctness of the second document had been impugned on a very vital point, but Mr. Major has been able, by means of an important geographical discovery of his own, to restore this valuable historical relic to its integrity, and from the evidence of the two documents combined to determine, beyond all dispute, the true site of the lost Greenland colony, and to show that at that period, which was a hundred years before the great voyage of Columbus across the Atlantic, there still existed remains of the ancient Scandinavian colonists in North America.

At the close of the 14th century a member of one of the most ancient and noble families in Venice, Nicolò Zeno, at his own expense, went on a voyage, rather of curiosity than discovery, into the Northern Seas. For two centuries before his time the Flanders voyage from Venice had been a matter of annual occurrence, but chance gave to this voyage a very peculiar interest. Nicolò Zeno was wrecked on the Feroe Islands, but fortunately fell in with Henry Sinclair, Earl of Orkney and Caithness, who was bent on increasing his possessions by naval conquests, and who took Zeno into his service as pilot of his fleet. After a year or two Nicolò Zeno sent a letter to his brother Antonio inviting him to join him, which he did, and it is from that letter of Nicolò's, and subsequent letters from Antonio to a third brother, Carlo (a very distinguished man in Venetian history), that the narrative of the movements of the two brothers is derived. They comprise, in the first instance, some insignificant expeditions in the Feroe and Shetland groups, but fortunately treat at greater length on two much more important subjects, viz., a visit by Nicolò Zeno to Greenland, disclosing some interesting facts which, brought into harmony with recent observations,

present a contemporaneous proof of the whereabouts of the lost colony of the Ostrebygd, about which there has been so much dispute, and to verify which the King of Denmark sent out Captain Graah on his famous voyage of 1828-30. In illustration of this portion of the subject, Mr. Major has adduced a highly important geographical discovery of his own, the ignorance of which led Captain Graah into great mistakes, and caused him to miss the value of a most precious early document which otherwise would have answered the question which he went out to Greenland for the purpose of solving. This was nothing less than a Chorography of the old Greenland colony and sailing directions for reaching it from Iceland, written by Ivar Bardsen, the steward of the bishop of the colony. In this route he speaks of some large rocks midway between Iceland and Greenland, called Gunnbjorns Skerries, which had formed a nucleus for the ice coming down from the north, and on reaching which a south-west course was to be taken. Captain Graah denied the existence of these rocks as thus described, and so forfeited the guidance of these valuable sailing directions. Mr. Major has discovered, by a legend in the 1507 edition of Ptolemy, that the island, of which these rocks form the summit, was blown up by a volcanic eruption in 1456; and in a map by Van Keulen, of about the date of 1700, the reef, 60 miles in length, formed thereby is laid down by the name of Gombar Scheer, with soundings at the north and south ends of 25 feet, whereas the nearest soundings northward range from 70 to 100 feet. Mr. Major further showed that Ivar Bardsen's Chorography had only to be read with common attention to indicate the site of the old colony beyond all dispute.

In the letters of Antonio Zeno are narrated the observations of some fishermen in North America in the last half of the fourteenth century. Their interest consists mainly in their antiquity and in their confirmation of those pre-Columbian discoveries of America by the Northmen which had been mentioned by Adam of Bremen in the 11th and Ordericus Vitalis in the 12th century, but on which so much light has been thrown in the present century by the Danish antiquary C. C. Rafn and others.

Antonio describes a voyage which he made with Sinclair and a large fleet to the west to verify the fishermen's story, and it has been thought by many, and amongst others by the great geographer Ortelius, that in this voyage the Venetians anticipated Columbus in the discovery of America. Mr. Major has shown, however, that this

was not the case; but that, being driven by a storm they knew not whither, they lighted on the coast of Kerry, were refused admission by the Irish, and were howled off the coast, which they followed all along the south and east side of the island, and which they quitted at its northern end, and finally made their way to Greenland. The whole story had been written out by Antonio Zeno; but a descendant of his, named Nicolò Zeno, born in 1515, when a boy, not knowing the value of these papers, tore them up, but, some of the letters surviving, he was able from them subsequently to compile the narrative as we now have it, and which was printed in Venice in 1558. There was found also in the palace an old map, rotten with age, illustrative of the voyages. Of this he made a copy, unluckily supplying from his own reading of the narrative what he thought was requisite for its illustration. By doing this in a blundering way, unaided by the geographical knowledge which enables us to see where he goes astray, he threw the whole of the geography which he derived from the narrative into the most lamentable confusion, while those parts of the map which are not thus sophisticated, and which are consequently original, present an accuracy far in advance by many generations of the geography even of Nicolò Zeno junior's time, and confirm in a notable manner the site of the old Greenland colony. In these facts we have not only the solution of all the discussions which have arisen on the subject, but the most indisputable proof of the authenticity of the narrative; for it is clear that Nicolò Zeno, junior, could not himself have been the ingenious concocter of a story the straightforward truth of which he could thus ignorantly distort upon the face of a map. I will conclude by observing that, if the realities which Mr. Major has detected had been made clear to people's minds, as they easily might have been, three hundred years ago, Martin Frobisher would have avoided the blunder of taking Greenland for Zeno's Frisland, which really meant the Feroe Islands: a host of learned commentators during that period would have been saved from confusing themselves and others by wild speculations: the site of the lost Greenland colony would have been established long ago on the highest possible authority, and the Kings of Denmark, from Frederic II. downwards, would havo been spared the necessity of sending out a great number of unsuccessful expeditions, and the name of a noble gentleman of the highest rank in the Republic of Venice would have been protected from the unwarrantable and infamous charge of being guilty of falsehood and forgery.

United States.—A convenient summary of the progress of geography and scientific exploration in the United States of America was given in the Annual Address of Mr. Chief Justice Daly, President of the American Geographical Society, in February last. We learn from this discourse that Professor Hayden, whose exploration of the wonderful district of the Upper Yellowstone I noticed at the last anniversary, has since been occupied in similar investigations in the territories of Utah, Idaho, and Montana, west of the Rocky Mountains. The exploration of the Yellowstone River district having excited so much public attention, a liberal grant was made by Congress in 1871-72 to continue the survey, and two parties (to each of which a geologist, a topographer, astronomer, and meteorologist were attached) were actively employed in the summer of 1872. One party, under Mr. James Stevenson, made a careful survey of the Teton Range, in Idaho. The second, under Professor Hayden, explored the valleys of the Yellowstone, Madison, and Gallatin, in the territory of Montana. The event of the season was the ascent of the Grand Teton, which proved to be 13,762 feet high, and therefore one of the loftiest peaks of North America. Four passes over the Rocky Mountains were surveyed, varying from 6443 to 7271 feet in elevation. The region explored is interesting as being the seat of the chief sources of the three great rivers of North America—the Missouri, the Columbia, and the Colorado. Astronomical observations were made by both parties for latitude and longitude at every available point, and materials obtained, for the first time, for a reliable map of this large extent of rugged country.

Besides his minor papers on the Yellowstone and other districts, Professor Hayden, as geologist to the territories of the United States, has published several larger and more elaborate reports on the surveys which he has carried out, all of which teem with information of great interest to the Physical Geographer. One of them relates to the geology of Wyoming, and another to Nebraska and adjacent territories: copies of which, together with an extensive series of photographs of large size, relating to the countries surveyed, have been presented to our library by the author.

In the Address of 1871, my predecessor, Sir Roderick Murchison, alluded in commendatory terms to the Topographical and Geological Survey of California, carried out under the direction of Professor J. D. Whitney. A series of handsomely illustrated quarto volumes had been issued by the State Government, giving the

results of the survey in various departments; but it is only recently that the elaborately-executed maps have been prepared for publication. We are indebted to Professor Whitney himself for early copies of some of the sheets, which are admirable specimens of cartographic art. I feel pleasure in adding that our Council last autumn elected this distinguished geologist and surveyor one of the Honorary Corresponding Members of the Society. We are informed by him that an important and long-desired reform has this year been brought about, at his instigation, in the management of the geographical exploration of the western portions of the United States. What was formerly the "Geological Survey of the Territories," under the direction of the Department of the Interior, is now the "Geological and Geographical Survey of the Territories." One of Professor Whitney's former assistants, Mr. Gardner, has been placed in charge of the topographical work, which will henceforward be systematically and skilfully prosecuted. The United States Coast Survey in future will have charge of the main triangulation of the interior and of the astronomical determinations of geographical positions. Geographical science will be greatly benefited by these new arrangements; for we must bear in mind that there has hitherto never been in the United States a systematic Government Survey like those of nearly all European countries, and that up to the present time cardinal questions in the geographical configuration of the North American continent—such, for instance, as the continuity or otherwise of the Rocky Mountain range with the Andes—have never been definitely settled.

Before quitting the subject of North America, I must mention the exploration of the stupendous cañon or gorge through which the River Colorado flows in its course to the head of the Gulf of California. According to Dr. Bell, in his paper published in the 39th volume of our Journal, this grandest of all the cañons of North America, 500 miles in length and for long distances more than 2000 feet in depth, was first penetrated and traced by an adventurer named White, who embarked with a companion on the upper course of the river, and was carried by the rapid current for many days down the narrow and gloomy chasm. Since then Professor J. W. Powell, under the auspices of the Smithsonian Institution, has undertaken a survey of this wonderful gorge, and we are informed that his second report was published last year. He has successfully navigated the river more than once through the wonderful series of cañons at the bottom of which it flows, and has made interesting

geological observations throughout the region, which have a bearing on the discussion as to the origin of these deep and narrow furrows in the earth's surface; for example, he has found an extensive series of "faults" running northerly and southerly *across* the Grand Cañon, the fissures of which have been vents for volcanoes, and are from 50 to 200 miles in length: thus showing that these deep river-gorges do not coincide with faults in the strata.

Other explorations, of more or less interest to geographers, are being carried on in North America, to which my limited space will not permit me to give more than a passing allusion: such are the surveys in connection with the Northern Pacific Railroad, between Lake Superior and Puget Sound, entailing the examination of 3843 miles of country; Dall's exploration of the Aleutian Islands; and Captain Jones's surveys in the Uintah Mountains, a spur of the Wahsatch range.

Central America.—An important geographical and commercial undertaking, in which the Government of the United States has been engaged for three years past, is that of the thorough exploration of the Isthmus of Panama, with a view to setting finally at rest the vexed question as to the best and most practicable line for a ship-canal from the Atlantic to the Pacific. The officer entrusted with this arduous task was Commander Selfridge, of the United States Navy, supported by a staff of surveyors and well-equipped body of men. He commenced the work in the winter of 1870, and since then has successively examined the various routes which have been advocated by projectors. All were found totally impracticable, except the most southerly line, namely, that from the Pacific to the Atrato. A preliminary survey having led to favourable expectations regarding this line, Commander Selfridge was sent again at the close of last year to examine the country between Cupica Bay and the Atrato, where he expects to find a depression in the Cordillera. A canal at this point would, it is calculated, reduce the distance by sailing-vessels, between New York and Hong Kong, from 110 to 83 days.

South America.—The magnificent cataract on the Potaro River, in British Guiana, called the Kaieteur Falls, the discovery of which by Mr. C. B. Brown I recorded in my last Address, has been re-visited by the Hon. H. S. Bascom, Major Webber, and Lieutenants Banfather and Jackson, of the 2nd West India Regiment. The

party took with them a professional photographer, and the result has been the publication of a handsome volume, from the pen of Colonel Webber, giving a narrative of the journey and description of the Falls, illustrated by a large number of exquisite photographs. The volume contains also much information regarding the geology of the districts visited; and geographers may congratulate themselves on having, at so short an interval after its discovery, the means of forming a fair idea of a region so marvellous in its physical configuration.

We have not received during the past year any further reports of the progress of exploration in the interior lands of Brazil, Peru, and the neighbouring States; survey work is, however, steadily advancing, at many points distant from each other. Thus we hear of progress being made in clearing and levelling the route for a line of railroad past the rapids and cataracts of the Madeira River, which I described in last year's Address, and which has for its object the establishment of water communication between the fertile provinces of Bolivia and Europe, *viâ* the Amazons. The Chilian Government, further south, is also continuing its work of surveying and mapping the southern parts of its territories. In the early part of 1872 Captain Vidal Gormaz, of the Chilian navy, was charged with the exploration of the Bay of Reloncavi, lying between the mainland and the island of Chiloe, his Report being published at Santiago early in the present year. During the progress of this survey, which was conducted with great care, a party of officers from the vessel, after exploring Lake Lanquihue, at the western foot of the Andes, ascended the extinct volcano Calbuco, and attempted also that of Osorno. We hope soon to obtain copies of Captain Gormaz' Report and the survey maps, for our Library and Map-Collection.

East of the Andes, in nearly the same parallels, a considerable addition has been made to our knowledge of the configuration of the mountain slopes by Mr. Crawford, the surveyor employed by the Buenos Ayres Government to explore a route for a line of railway, to cross the Pampas and the Planchon Pass over the Andes into Chili. The course of the Rio Grande, and of other streams flowing towards the Rio Negro, were for the first time accurately laid down, and a series of levels taken across the Andes. The Planchon Pass was found to be 8225 feet above the sea-level, and a practicable, though somewhat tortuous, line for a railway was found across it.

It is probable we may soon hear of another adventurous exploit of Commander Musters in this region, for, as I have recently been informed by his brother, Mr. J. C. Musters, he had completed his arrangements in March last for crossing the Andes from Valdivia to the head-waters of the Rio Negro, where he expected to be well received by his former friends the Patagonians. He intended to proceed to Rio Bueno, and to cross the Andes by Lakes Ranco and Lacar. He had heard of a great gathering of Patagonian Indians on the eastern side, preparatory to a raid on a large scale on the Argentine settlements—a state of affairs which would seem not at all favourable to his enterprise.

Further north, in Paraguay, we learn that the Government is preparing a scientific commission to explore the mineral, botanical, and zoological productions of the country, and to report on its geography, climate, statistics, and so forth. The members of the Commission are to be chosen in Europe, and the Consul-General of the Republic, Professor Leone Levi, has done our Council the honour to invite them to recommend a qualified gentleman to serve as geographer and statician. In a country so favourably situated as Paraguay, reported on all sides to abound in natural wealth, but of which we know so little, an expedition of this kind could not fail to benefit the various branches of science.

AUSTRALIA.—The event, in this portion of the globe, most interesting to geographers is the completion of the Electric Telegraph across the Australian continent. The first message was transmitted by it to London in November last, just ten years after our late Medallist, John MacDouall Stuart, returned to Adelaide from his wonderful journeys, which opened the way for this great international work. When the Royal Geographical Society awarded Stuart the Patron's Medal in 1861 (before he had completed his discoveries), Sir Roderick Murchison, on the occasion of its presentation, enthusiastically alluded to this prospective telegraph line, and said:—"When this telegraphic communication from south to north is opened out across Australia, may the first message transmitted be 'Honour to MacDouall Stuart.'" In his last Address he again alluded to it in connection with the approaching construction of a line of telegraph:—"It would have been a bold prophecy in 1861 that should have predicted so early an extension of this very line of communication." As is well known, the surveying parties of the telegraph expedition under Mr. Charles Todd were the imme-

diate successors in the footsteps of our Medallist, for the line is carried directly over Stuart's route. His name, however, was lost sight of in the natural congratulations which hailed its completion.

This hand-rail across the continent must have a very important bearing on the question of the exploration of the western half of Australia, as each of the eleven intermediate telegraph stations on the long line will afford a point of departure or refuge for any expedition attempting it. Another point will be the gain to meteorology, as the daily weather reports, recorded at each of the thirteen stations on the 1973 miles of its meridional length, will hereafter afford a good insight into the peculiarities of the climate of the interior.

It is to be regretted that Mr. Forrest's proposal to the Western Australian Parliament in August last was postponed. Mr. Forrest has proved himself to be so able an explorer that complete success would almost certainly have attended his endeavour to solve the great problem of the nature of the country lying between the Murchison River on the west coast and the telegraphic line at the centre of the continent. The adventurous journey of this distinguished traveller, from Swan River to Adelaide, along the south coast, between April and August, 1870, has been recorded in a former Address.

Several expeditions are, however, in the field to explore the region in the reverse direction, *i.e.* from the telegraphic line towards the west coast. First, that of Major Warburton, who left the Peak River (lat. 38° s.) with his camels and party in October last, and reached Alice Springs, a station on the telegraphic line near Central Mount Stuart (lat. 22° s.). From this point he despatched Mr. Burt, his second in command, to the settled districts for fresh supplies. Mr. Burt performed a journey of 800 miles on a camel in twenty-five days, reaching Adelaide, and returning to Sharpways Springs on March 6, 1873. Major Warburton determined to remain at Alice Springs till the cool weather came on, and would then proceed on his intended westward route.

Another expedition, namely, that of Mr. Gosse, the South Australian Government explorer, was to leave Alice Springs on March 10th for his journey to Western Australia.

A third expedition, under Mr. Ernest Giles, has been sent out from Victoria, under the guidance of Baron von Mueller, who took with him Mr. Carmichael as a volunteer, and Mr. A. Robinson as

an assistant. In his second attempt to penetrate from the telegraphic line towards the sources of the Murchison, he was baffled by a vast salt expanse, which he named Lake Amadeus. This was on October 24th, 1872, lat. 24° 32′ S., long. 129° 38′ E. A lofty mountain was seen 75 miles to the northward, and was named Mount Olga. He passed through a varied country; in some places very arid, and in others most fertile, and brilliant with a diversified flora. The spot reached was near the western meridional boundary of South Australia, and although he was supplied with all necessaries for proceeding, he was compelled to return in consequence of his companions not wishing to proceed. He was, by the last news, however, awaiting the cool season to renew his journey toward the head-waters of the Murchison, by skirting the south side of Lake Amadeus, and then striking Mount Olga, where he is confident of finding fresh water. Mr. Giles, in a former journey, had reached nearly to the same meridian, but 100 miles to the northward of it. His botanical and geological notes will prove of great interest.

In the Northern territory, Mr. Cleland and party had ascended the Daly River in boats for 100 miles, and had then found it was 200 yards wide. The Roper has been found to be a very fine river, and the northern harbour of Port Darwin and its town Palmerston promise to become of importance, from the proximity of the new gold-fields, as well as from their good position for commerce.

I cannot quit the subject of Australian Exploration without an allusion to the death of the well-known explorer, Mr. John McKinlay, who died on the 31st of December last, at Gawler East, South Australia. It will be in the recollection of all who have watched the progress of Australian discovery that this meritorious traveller was awarded, in 1862, a gold watch for his successful explorations.

ASIA.—During the past year the Geography of Asia—and especially of Central Asia—has attracted attention to an unusual extent. Commencing from the west, I propose briefly to notice the progress of our geographical knowledge in respect to the various portions of the Asiatic continent:—

Palestine.—As a continuation of the review of Explorations in Palestine which I gave in my last year's Address, I have been furnished by Captain Wilson, R.E., with the following complete *résumé* of the proceedings of the Palestine Exploration Fund.

In June, 1871, the executors of the Fund determined to take immediate steps to complete the survey of Palestine in an accurate and systematic manner, and no time was lost in making the necessary preparations. Captain Stewart, R.E., was entrusted with the conduct of the survey, and two non-commissioned officers of the Royal Engineers, good observers and surveyors from the Ordnance Survey, were selected to accompany him. The Committee were also fortunate enough to obtain the services of Mr. Tyrwhitt Drake, who had previously accompanied Mr. Palmer in his journey to the Tih and Moab, and Captain Burton in his tour through the volcanic region east of Damascus, and who was at the time in Palestine.

On the 8th November, 1871, Captain Stewart landed at Jaffa; but hardly had he commenced work when he was attacked by a severe illness, which compelled him, after transferring the charge of the party to Mr. Drake, to return to England, and eventually resign. Lieutenant Condor, R.E., was appointed to succeed Captain Stewart, and on his arrival at Nablus in July, 1872, assumed the charge of the survey, which has since been carried on under his direction.

A base line, 4·2 miles in length, was measured near Ramleh, on the plain east of Jaffa, and from this the triangulation was carried away in a series of well-shaped triangles. The position of the base line, with regard to the meridian, was fixed by observations of Polaris; and a series of observations for latitude were made of Ramleh, giving results which agreed excellently with those derived by triangulation from the Admiralty latitude of Jaffa. By the end of March, 1872, Mr. Drake was able to report that a complete connection had been established between Jaffa and the triangulation of Captain Wilson's survey of Jerusalem, and that 100 square miles of country had been surveyed and drawn. The triangulation was now carried northwards, and connected, in September, with a second base, 4·5 miles long, measured on the flattest portion of the great plain of Esdraelon. From this base the triangulation was extended to the north and west; and on the 20th January, 1873, Lieutenant Condor reports that it had been carried to Haifa and Carmel, and that 1250 square miles of country had been surveyed and drawn on the sheets prepared in England. The calculated length of the second base was found to agree with the measured length, and the position of Acre, as derived from the triangulation, differs but slightly from that assigned to it by Captain Mansel, R.N., on the Admiralty chart.

The survey is now in progress between Carmel and Jaffa, and Lieutenant Condor hoped to be able to complete this section before the hot weather set in.

In addition to the triangulation, observations for latitude and variation are made at the principal places, and the altitudes are determined by reciprocal angles of elevation and depression as well as by aneroid barometer.

Tracings from the original survey, which is on a scale of one inch to a mile, have been received in England, and bear testimony to the high character of the survey, and the zeal and ability with which it is being carried out. The Committee are now engaged in making arrangements for its early publication.

In connection with the survey, special plans of interesting localities are made on a larger scale, as well as detailed plans of ruins, tombs, &c. The names of all ruins, valleys, hills, &c., with any traditions relating to them, are collected by Mr. Drake, who is also a close observer of the native manners and customs. Meteorological stations have been established by the Fund at four different places in Palestine, and the surveying party is also provided with a complete set of instruments. A geological map of Palestine is being prepared by Lieutenant Condor.

A Palestine Exploration Fund has been formed in the United States to co-operate with the English Fund, and an arrangement made by which the survey of the country east of Jordan will be undertaken by an American party. An expedition fully equipped has recently left Beyrout for the east of Jordan, and we may soon hope to obtain interesting details of its progress. The expedition is commanded by Lieutenant Steever, of the United States Engineers, who is accompanied by Professor Paine and Mr. Vandyke, junior.

In 1870, Captains Mieulet and Dorien, of the French État-Major, proceeded to Palestine with a view of constructing a map of the country; they were actively employed three months, and during this period, besides measuring a base on the plain of Acre, were enabled to make a survey of about 1000 square miles. A map is now being prepared from the field sketches which were made on a scale of $\frac{1}{100000}$, and contains all names written in French and Arabic.

The details of Canon Tristram's expedition into Moab and Edom during the winter of 1871–2 are on the eve of publication, and his work will be found to contain much interesting information on the topography of those countries.

During the present year a beautifully executed map of the northern portion of Palestine, containing information derived from the most recent surveys and expeditions, has been published by Mr. John Murray, and the issue of a second sheet, which will complete the map of Palestine, may be expected at an early date.

Mesopotamia.—In my last year's Address I ventured to hope that occasion would ere this have been given, in connection with a proposed railway between the Mediterranean and the Persian Gulf, to open up and extend our knowledge of the geography of the Tigris and Euphrates valleys; but I regret to say that these hopes have not been realised. Various circumstances have combined to discourage all railway enterprise in that region, and thus to prevent any immediate steps being taken for executing surveys of the different lines. It has been found, in the first place, impossible to raise the capital necessary for an undertaking of this gigantic character without some sort of guarantee from the British Government; and Parliament has decided that the national interests are not involved to that degree which would justify the public funds or the public credit being pledged in support of such an enterprise in a foreign country. The vicissitudes of political life, again, in Turkey have prevented even that partial realisation of the scheme which at one time seemed probable. Midhat Pasha, while employed as governor of Turkish Arabia, had projected a line of railway from Tripoli on the Mediterranean to Baghdad, and he would certainly have carried the project into execution, after his elevation to the Grand Viziership, if the reins of power had remained long enough in his hands; but his tenure of office was so brief that little or no progress was made with the preliminary surveys, and, since his dismissal, the scheme seems to have sunk into oblivion. The only prospect that now offers of benefiting Geography by the creation of a railway system in Asia Minor and Mesopotamia is as a means of access to Persia, where important concessions have lately been made to British capitalists, which for their due development require a rapid and unimpeded communication with Europe; but such schemes are still in the far future, and do not call therefore, at present, for serious consideration. In the mean time it is satisfactory to know that Captain Felix Jones's map of the countries between the Persian Gulf and the Mediterranean is rapidly approaching completion; the whole of the elaborate work of the Anglo-Russian Commission upon the Turco-Persian frontier having been incorporated into the map to represent its eastern boundary, while the valleys of the Tigris and

Euphrates have been laid down, in great detail, from a comparison of all the really authentic materials that exist. An incidental advantage, too, resulting from Captain Jones's work has been that, the attention of the Government having been thus drawn to the inconvenient scale of the Foreign Office copy of the Turco-Persian frontier map, which consists of 20 huge sheets, Sir Henry James has been directed to issue a reduced copy from his office, which shall admit of general circulation; and I may add that the present time is particularly opportune for giving publicity to this beautiful specimen of British cartography; since the two Governments, whose frontier districts were surveyed by our engineers twenty-five years ago, are at length about to carry into effect the various adjustments of territory which were then recommended by the Delimitation Commission.

Persia.—Since our last anniversary, the Society has had the advantage of becoming acquainted with the result of Sir Frederick Goldsmid's geographical labours in the east of Persia. Papers have been read describing the journey of the Arbitration Commission from Bunder Abbas through Kerman to Seistan, and reporting fully on the districts that have been so long in dispute between the Persian and Afghan Governments. The rapid journeys of former travellers through the province of Seistan—of Christie, of Edward Conolly, of Forbes, and of Pattinson—performed under circumstances which prevented anything like accurate observation, had yielded very imperfect results; so that the value of the map executed by the Engineer officer, Major Lovett, under Sir F. Goldsmid's orders, together with General Pollock's sketch-route along the Helmend from the town of Bost to the Lake, are all the more appreciated. It now appears that a large canal, of which the traces are still to be seen, bearing the name of *Jui-Gershasp*, left the Helmend in antiquity at *Roodbár*, and penetrated 50 or 60 miles into the desert to the south-west, where it watered the old capital, which was called Agriaspe by the Greeks and *Ram-sheheristan* by the early Arabs. The other great canal of *Siná-rúd*, which watered the town of Zaranj, and supplied all the lesser irrigating channels to the south of the river, was probably the same arm which now leaves the Helmend at the *Bend-i-Kohek*, and which has been assumed in most of the recent maps to be the true bed of the river. The old Zaranj, so celebrated in Oriental history, would thus be represented by some of the ruins in the neighbourhood of Sikoha; while *Doshakh* (or *Jellalabad*), to the north of the river, which Macdonald Kinnier

identified with Zaranj, would be in reality the *Qurnein* of the Arabs (the names having the same significance in Persian and Arabic of "the two horns"), which was the native place of the famous Soffarian dynasty. It has been now decided that the line of delimitation between Afghanistan and Persia should follow the bed of the river Helmend from the Lake to the *Bend-i-Kohek*, and from that point should be marked by an arbitrary line drawn across the desert to a peak in the southern hills; so as to give to the Afghans the entire right bank of the Helmend down to the Lake, together with the left bank as far west as the Bend; while the whole extent of Seistan Proper, on the left side of the river below the Bend, and irrigated by canals thrown off at the Bend, is allotted to the Persian crown. The impartiality of this award may be judged of from the fact that at first it was acquiesced in neither by one party nor the other; but wiser counsels have now prevailed, and although it must be admitted that the distribution of territory, considered geographically, has not much to recommend it—inasmuch as it is independent for the most part of any natural division—still it was at the time the only practical settlement that was at all possible; and it will be respected probably in the future, when passions have cooled, as under the circumstances a fair and equitable compromise.

It is most favourable to the interests of Geography that this system of avoiding political complications by determining disputed lines of frontier through the agency of mixed commissions, accompanied by professional engineers, should be generally adopted in the East. We have already seen the admirable geographical results achieved by the several arbitration commissions which have surveyed the Turco-Persian frontier, and more recently the Perso-Belooch and Perso-Afghan frontier, and we may anticipate an equal geographical success when the same practical treatment shall be applied to those other localities which as yet have merely figured in diplomatic correspondence. The frontier line, for instance, between Khorassan and the Turkoman Steppes, which in the Russian maps is made to follow the main stream of the Atrek to the vicinity of *Bújnúrd*, but which is defined by Persia as the northern watershed of the Atrek and its right-hand affluents as far as *Abiverd*, will assuredly at no distant day require to be surveyed and mapped, no European, as far as I am aware, having ever yet passed along the northern slope of the *Kuran-dagh*, and its prolongation from the shores of the Caspian to *Serakhs;* and in the same way a commission must inevitably sooner or later visit the whole extent of the Afghan

frontier, from Seistan by Herat, the *Murghâb* and *Meimeneh*, to the Oxus, and along that river from *Khoja Saleh* to the Lake Victoria of Wood, the political dependency of many districts upon that line, such as *Roshan*, *Shignan*, and *Darwaz*, being still subject to uncertainty, while the position of several important points is as yet undetermined. In the mean time, Colonel Yule, indefatigable as ever, has being doing all he can, in default of scientific observation, to throw light on the geography of the Oxus. He has edited, with corrections and explanations, the valuable reports both of Pundit Munphool on Badakhshan, and of Feiz Bukhsh on the route from Cabúl to Yarandk, and in his elaborate introduction to Wood's travels, which was published at the close of last year, he has brought together and exhibited in a clear and connected form everything that is known upon the subject. His most curious discovery perhaps is that which relates to the origin of Klaproth's misapprehension of the geography of the Oxus, a misapprehension which is apparent in all the pseudo travels that he concocted, and which to the present day vitiates the maps of the Russian Government and hampers their diplomacy. Yule has discovered that a certain square of the Chinese map, constructed in 1759, which was the groundwork of Klaproth's geographical knowledge, had been accidentally turned round through an angle of 90°, so that the district of *Wakhán*, for instance, instead of being laid down in the same parallel as Badakhshan, was placed in the map 100 miles to the northward, and thus appeared to Prince Gortchakoff to be conterminous with *Kara-tegin*. Colonel Yule's memoir on the subject, illustrated with maps, will appear in the forthcoming volume of the 'Journal,' and will well repay perusal.

Nor must I omit to mention the facilities for extending our geographical knowledge of the various mountain-chains of Persia, which are likely to be afforded through the concessions that have been lately made to Baron Reuter by the Government of that country. The most important of these concessions relates to the creation of a railway system throughout Persia, which shall not only connect, in the first place, the capital with the Caspian, as the easiest means of entry into the country, but shall also provide in the sequel for the radiation of lines leading from Teheran to the Persian Gulf, the Black Sea, and the Mediterranean. Measures, indeed, are being now organised for undertaking the preliminary surveys which will be required to determine the lines of route to the south and west that present the least engineering difficulties;

and many portions of this vast country, which are now unknown except from native report, will thus soon be represented on the official maps. I may add that the accessions to our knowledge of the geography of Persia, through the recent journeys and observations of our Engineer officers, employed both in the telegraph department and with the arbitration commissions, are already so considerable that Majors St. John and Lovett have been employed by the India Office to construct a new map of the country, which will admit of enlargement and improvement as additional materials are accumulated.

I would further draw attention to the very excellent geographical work in regard to Eastern Persia and Central Asia that is being accomplished by the Topographical Department of the War Office. A most valuable summary of all our recent information regarding these countries has recently been issued "for official circulation only," and the maps which accompany the pamphlet, and which have been compiled from all available sources of inquiry, Russian as well as English, are by far the most complete and the most reliable that have ever yet appeared. These maps, indeed, are of so much interest and value that, although issued confidentially at present, I cannot avoid expressing a hope that they will soon be rendered accessible to the public.

And, in concluding this brief sketch of the progress of Geography in Eastern Persia and Central Asia, I would point to the pending operations against Khiva, and remind the Fellows that the march of the Russian columns across the Steppes, accompanied as they are by professional topographers, is in reality a series of exploring expeditions, each line of route lying through portions of country never before mapped and surveyed, and the general result of the campaign thus promising a vast accession to our geographical knowledge. Although, indeed, there were extensive reconnaissances previous to the concentration of the troops, both in the Turcoman desert between the Caspian and Khiva and in the barren tract intervening between the Lower Jaxartes and Oxus, still in no single instance, I believe, had the line to be followed by the different columns been examined from beginning to end; and in some localities, such as in the interval between the Bukan Hills and the Oxus, and again to the south-west of Khiva, it is thus possible that difficulties may yet be found to exist that will essentially impede the march, though not, of course, to a degree that can at all affect the eventual success of the campaign.

Kashgaria.—The interesting and exhaustive papers of Messrs. Shaw and Hayward, published in the Journal of our Society, upon the geography of Chinese Turkestan, have rendered us familiar enough with the high-road leading from the frontiers of Ladak through the towns of Yarkend and Yangi-Hissar to Kashgar; but we really know very little of the vast region intervening on one side between Yarkend and Samarcand, and stretching on the other to the frontier of China Proper. It is, therefore, of the utmost interest to us that we now learn of the deputation of a well appointed mission, under the guidance of that experienced diplomatist, Mr. Douglas Forsyth, to the court of the Ataligh Ghazi. The geographical importance of this mission is so well explained in a letter which I have recently received from Mr. Forsyth that, in preference to offering any further observations of my own, I venture to publish from it the following extracts:—

"*En route* to Simla,
"April 2nd, 1873.

"You will have heard that Lord Northbrook has decided on sending an Embassy to the Atalik Ghazee, and has appointed me to the charge of it. The expedition is to be well equipped, and we shall remain in Kashgaria all the winter. This is a glorious opportunity for obtaining geographical and other scientific information; and nothing shall be wanting on my part to secure complete exploration of parts hitherto unknown.

"As you are aware, I have long turned my thoughts to Central Asia, and was the first to propose opening out this country, and I induced Shaw to make his brave and successful voyage of discovery. Our last expedition was not properly equipped, but I was fortunate in having an amateur geographer in my companion and assistant Shaw; and though his researches were necessarily imperfect, it was very gratifying to find that your Society acknowledged so handsomely his exertions.

"On the present occasion, however, I am glad to say Lord Northbrook has consented to allow me the services of a professional surveyor, and Colonel Walker has selected one of his best assistants, and one of the well-known Pundits, to accompany me, and thus I hope to be able to lay before the Geographical Society, on my return, complete and thoroughly reliable information.

"Should there be any topics to which you would wish me particularly to turn my attention, I shall be glad to have your advice and help. I am informed by the Envoy, Mohamad Yakub Khan, who has himself travelled as far as Karashahr, that there is a river which flows from that town in a southerly direction towards Tibet, and that a regular caravan route goes from that city to Lhassa. The Atalik sent one of his officers across the Desert of Gobi to Khoten, who reports that the country intervening is a wilderness rather than a desert, in which grass, wood, and water abound, and plenty of animals of all kinds are to be found. I am very anxious to have this explored by some competent man; probably we shall depute the Pundit for this purpose.

"On our return it is probable we shall take the route over the Pamir and through Badakhshan, and thus be able to throw professional light on those regions.

"We shall, probably, leave India in July, taking the route through Ladak and by the Chang Chemno Valley.

"T. D. FORSYTH."

The Royal Geographical Society, I feel assured, takes the greatest interest in Mr. Forsyth's success, and will impatiently await the reports that he may send us of his progress during the ensuing autumn and winter. It is a further subject of congratulation that our Medallist, Mr. Shaw, has just returned to India to resume his functions as Commissioner at Ladak, so that his services will be available on the spot to facilitate the passage of the mission through the territories of the Maharaja of Kashmere, and to co-operate with Mr. Forsyth in pushing discovery both to the east and west, after the party has fairly taken up its position at the court of the Ataligh.

Dardistan.—Dr. Leitner, the able and energetic *savant* who has contributed so much to our knowledge of the countries lying between Badakhshan and Kashmir, has recently arrived again in England from Lahore, bringing with him a Siah Posh Kafir, as a living illustration of the ethnology of the region. He has brought also large collections of antiquities, statues, arms, and coins, the fruits of his own indefatigable researches; and also numerous manuscripts of such of the races as possess any written character. These latter, together with the Græco-Buddhistic sculptures brought over by Dr. Leitner, cannot fail to excite the interest of all students of Asiatic history and ethnology. The collections, I understand, are for the present deposited in the International Exhibition at Vienna.

Great Trigonometrical Survey of India.—This work during 1871-72 was carried on under the superintendence of Major T. G. Montgomerie, R.E.; the great triangulation was extended over a total direct distance of 396 miles, and with the secondary triangulation a total area of 23,840 square miles has been covered with accurately-fixed points for future topographical and geographical purposes.

The operations were carried over various little-known parts of India, one series passing through the wild territory south of the Mahanuddy River from Belaspur towards Jeypoor—a hilly tract west of the coast between Calcutta and Madras, which has hitherto been visited by very few Europeans. The work was much hindered by the unhealthiness of the country and the number of tigers.

A farther extension was made in Assam. In the south of India the operations have embraced a portion of the west coast south of

Coimbatore, which may be said to be almost *terra incognita.* Though so near to Madras, the geography of that part of the country has made very little progress since the beginning of the century, survey operations having been mostly directed to our acquisitions to the north, whilst Madras, which at first was most favoured as to surveys, has made no progress. Hills, though known to exist to the south of Ootacamund, were barely indicated on the maps, and yet Major Branfill's triangulation now proves one of them, viz. the Aneimudi Peak, in the Aneimallei range, to rise to an altitude of 8837 feet above the sea, or 200 feet higher than Dodabetta, which has hitherto been supposed to be the highest peak in Southern India; and in determining the heights of the Aneimallei range, a valuable addition has been made to the geography of Southern India.

A farther important addition has been made by that portion of Major Branfill's triangulation which extends about 120 miles along the coast of Magalore, which covers a large gap which had been left unsurveyed by the early operations of Colonel Lambton. A large number of heights were moreover determined in the above tracts by aneroid barometers, which will be extremely useful as giving a general idea of the levels of the country.

Lieut. Rogers, R.E., also determined a number of heights by the aneroid in Madras and in the Nizam's territory, which will be similarly useful.

All of these heights will be published hereafter in the forthcoming volume of our 'Journal.'

The topographical surveys in Gujerat and Kattywar have made considerable progress, and already cover a large portion of the blanks which the atlas sheets of India have hitherto shown in that quarter. The Kattywar survey embraces a portion of the Gir Mountains, and during the season Capt. Trotter, R.E., in charge of the survey, was fortunate enough to shoot four of the lions which are still numerous in Kattywar, though they only exist in very small numbers in two or three other places in India.

The regular survey operations in the Himalayas embraced portions of the British districts of Kumaon and Gurhwal, including some of the south-eastern sources of the Ganges proper, such as those running from the Mana and Niti passes; the triangulation was carried to the head of the Niti pass, and three stations were established on peaks on the great ridge of the Himalayas, from which a good view was obtained of the Trans-Himalayan range across the upper basin of the Sutlej. In this snowy range eight

conspicuous peaks were fixed. One of these is the celebrated Kailas Purbat, which dominates over the Mansarowar Lake, and reaches an altitude of 22,028 feet above the sea. The connection of these peaks with the great triangulation will assist in determining the topography of other parts of Tibet, as they are known to be visible on all sides to very great distances in the interior.

Considerable progress has been made with the regular survey of Kumaon and Gurhwal Mountains, and we may shortly expect to have the finished maps of the whole; the sheets already published, on the scale of one inch to the mile, compare well with the Swiss and Italian maps of the Alps, which is gratifying, as it is the first time that it has been attempted to delineate the topography of mountains rising to upwards of 25,000 feet on such a large scale.

In cartography Major Montgomerie has published a map of routes in Northern India, including the whole of the routes in the Western Himalayas, Kashmir, &c., and extending to Yarkand on the north-east, and to Afghanistan on the west.

Major Montgomerie has also commenced a series of Trans-Frontier Maps, based on the operations of the Great Trigonometrical Survey, and on the various explorations that have been made from time to time by British and Asiatic explorers from the side of India, more especially on those recently made by Asiatic explorers. Two sheets of these Trans-Frontier Maps have already been published, which will be useful in studying questions connected with the extensive frontier of British India, or with any of the foreign territories lying beyond it.

The Trans-Himalayan and Trans-Frontier explorations, under Major Montgomerie's instructions, have been continued in various directions on the western, northern, and north-eastern frontiers. On the whole, great progress has been made, and one continuous line of explorations beyond the frontier has now been carried right round India, and the *terræ incognitæ* beyond the boundary have been greatly diminished.

In his report for 1872, Major Montgomerie gives the details of explorations made between Darjiling and Nepal on the south, and Shigatze, in Great Tibet, on the north. The explorer, a native of India, went right round the great Mont-Everest, penetrating on the north to the Sang-po, or Brahmaputra River, and thence south-west over the Tingri-Maidan, the most extensive plateau on the south of the Himalayan watershed. This plateau nowhere falls to a lower level than 13,500 feet, and though it is drained by rivers which flow

direct into India, it has not as yet been visited by a single European. It is used by the Tibetans for grazing their flocks, and has from time to time been crossed by Tibetan and Nepalese armies, though the routes leading to it are such on the side of Nepal as to make it difficult for a man to pass with a load.

The path along the Bhotia River is carried along the sides of a precipice overhanging a chasm for nearly half a mile in one place. Amongst other places this exploration has fixed the position of the celebrated Buddhist monastery Sakya, which is second only to that of Tasbi-Lumbo. The route, 844 miles in length, opens out 550 miles of entirely new ground, and with its bearings, branches, &c., elucidates the geography of nearly 30,000 square miles of what has hitherto been all but *terra incognita*, though the source of the Kosi River, the largest tributary of the Ganges. The courses of the upper feeders of the Kosi have, indeed, hitherto been a puzzle to Indian geographers.

The exploration is interesting, as giving us some idea of the topography of the mountains around Mont-Everest, the highest in the world, and also because it determines the position of the Himalayan watershed at two more points of this little-known portion of the great range. As usual, the watershed has been found to be far behind, or north of, the great peaks, which are visible from the plains of India, and apparently forming a continuous chain.

During the season of 1871-1872, the Great Trigonometrical Survey completed 10,310 square miles of principal, and 13,530 square miles of secondary, triangulation. Mr. Rossenrode, on the Bider Longitudinal Series, and Mr. Beverley, in prosecuting the Assam Valley Triangulation, encountered great difficulties, owing to the wild and malarious nature of the country: but good progress was made both on those series and on the Bangalor Meridional and Mangalúr Longitudinal Series. Major Branfill who is conducting the latter series, has made the important discovery that one of the peaks of the Anamalley Range (8837 feet above the sea) is higher than the Dodabetta Peak on the Nilgiris, which had hitherto been supposed to be the highest mountain in India south of the Himalayas. Topographical operations have been carried on in Guzrat, Kattywar, and Kumaon; and the completion of Captain Basevi's pendulum observations has been entrusted to Captain Heaviside.

Seven Topographical Surveys have been at work, under the immediate superintendence of the Surveyor-General, in Gwalior,

Khandesh, Vizagapatam, Belaspur, Malwa, Rajputana, and the Lushai country. The ground occupied by each party is very wild and unhealthy, for, as the more civilised parts of India are surveyed, it is necessary to penetrate into the thinly-inhabited mountains and deserts; and thus the great work steadily advances towards completion. There has been the usual activity in the drawing and compiling branch of the Surveyor-General's office at Calcutta, and several useful general maps have been issued, while great progress has been made in engraving the sheets of the Atlas of India.

The Revenue Surveys in the provinces under the Government of India have hitherto been divided into two branches. The native surveys, for settlement purposes and for the measurement of fields, are useless for geographical purposes. But the professional revenue surveys are most valuable and accurate; and the work of such surveyors as Colonel Johnstone in the Punjab, as Captain Tanner in Bhawalpur, and of others, forms an important addition to our geographical knowledge of India. I dwell particularly on the difference between the rough native surveys of fields and village boundaries and the accurate professional revenue surveys, because a passage in my Address of last year on this subject (p. 71) may perhaps be open to misconstruction. It is very satisfactory to find that the system of prosecuting the revenue surveys on strictly accurate principles in all their details, and of entirely getting rid of the old inaccurate native measurements, is to be introduced, and that a proper cadastral survey has already been commenced in the Moradabad and Muttra districts of the North-West Provinces. The Madras Revenue Survey, which has been executed on correct principles from its commencement, has made good progress during 1871-72.

Russian Explorations in Northern and Central Asia.—Among the latest achievements by Russian geographers are the astronomical observations of Scharnhorst, who accompanied Kaulbar's mission to Kashgar, and by means of Pistor's circle and four pocket chronometers succeeded in determining 13 new positions on the route between Tokmak and Kashgar. Scharnhorst has also taken a series of magnetic observations in Turkestan, which will fill in the gap left between observations in Siberia, Orenburg, the Caspian Sea, Persia, and Afghanistan.

The expeditions of Prjivalsky to South-West Mongolia and the Upper Hwang-ho, have produced results of much importance to

Geography. This traveller passed ten months in 1871 in exploring the south and south-east of Mongolia, between Dulai-nor and the frontiers of the Chinese province of Hansu. At the beginning of last year he set out again from Pekin upon another expedition to the same country, with the intention of penetrating to Lhassa in Thibet, and, if possible, of reaching in that way Russian Turkestan; or failing this, of making his way into India or Southern China.

On the 5th March, 1872, he left Kalgan, and, having been much detained on his road by snow-storms and bad weather, arrived on the 9th April at the Yellow River. Prevented from crossing that river at Munni Ula, and from entering the Ordos territory, he was forced to make his way to Bautan, and to cross at the same place as before, and, giving up all idea of entering Ordos, to make the best of his way along the left bank of the Yellow River to Alashan.

On the 26th May he arrived at the Alashan town of Din-yuang-ing in time to join a caravan of 30 Mongols and Tibetans who were about to start for the temple of Chob-seng, in the province of Kansu, five days' march from Lake Koko-nor, and about the same distance from the town of Sining, which was occupied by the Mussulman insurgents, who had compelled the Chinese troops to evacuate the town, and the Chinese amban (governor) to take refuge at the town of Sa-yang-cheng, on the borders of Kansu and Alashan. Chob-seng is 22 days' march from Din-yuang-ing, and is situated in the mountains north of Lake Koko-nor. Here M. Prjivalsky expected to gather a rich harvest of zoological specimens, as, according to the report of the Mongols, these mountains are well clothed with forests, which abound in wild beasts, such as tigers, panthers, deer, musk, &c., and the yak or tangut buffalo and long-horned antelope are to be found near Koko-nor. Later news of this expedition is communicated by General Vlangali, the Russian Minister at Pekin, who telegraphed to say that Prjivalsky passed the autumn of 1872 near Sining, north of Koko-nor, and intended wintering near the lake.

Some interesting details of this expedition are given in the 'Transactions of the Russian Geographical Society,' where some account will also be found of the insurrection of the Mussulmans, which is depopulating vast tracts of country and destroying towns and villages between Russian territory and the Chinese province of Kansu.

In the last Anniversary Address allusion was made to the explorations in the steppes of Turkomania to the east of the Caspian, and in the vicinity of Krasnovodsk Bay. According to Colonel Stebnitzky's report, a further distance of 155 versts of the old river-bed of the Amu-daria has been explored during the course of last year, which, together with the 282 versts explored in 1871, makes a total of 437 versts of explored river-channel, and it is estimated that not more than 210 versts (140 miles) intervened between the most advanced position of the Russians and Khiva, which has been appropriately termed the western gate of Central Asia. Explorations have also been made at Mount Kouren-tagh and along the Atrek from its tributary, the Simbar, to its embouchure in the sea.

In the autumn and winter of 1871, Colonel Markosoff organised three reconnaissances into the steppes, with the view of putting an end to the raids of the Turkomans, by striking a blow at their chief centres of habitation. The first of these expeditions was directed a little to the north of east from Krasnovodsk to Sari-Kamish, on the road to Khiva; the second to the Centre and Lower Us-boi (the old river-bed of the Oxus); and the third to the Atrek, between which river and the Kara-su there is a long strip of so-called Turkoman territory. Topographers accompanied all three detachments, and exact route measurements were made on the march. The first reconnaissance proved the practicability of the road from Krasnovodsk to Khiva, along its whole extent, for all kinds of troops, notwithstanding Mouravieff's and Vámbéry's remarks to the contrary.

An important *reconnaissance* has recently been made by an able Russian officer, M. A. Charoshchin, of the sandy desert of Kizil-Kum, lying between the Jaxartes and the Oxus, at the lower part of the courses of these rivers. The only account of this exploration which I have been able to obtain is that given by M. Vámbéry, in the May number of 'Ocean Highways,' at p. 59:—"M. Charoshchin traversed the desert in various directions, and visited parts of it which were unknown even to the Central Asiatics themselves. His travels extended over all the principal halting-stations throughout the steppe; the positions of the wells were noted, and the encampments of the Turkoman and Kirghiz tribes, which are numerous along the outlying hills at the foot of the Karatau, and from Jizak to the well of Balta-chaldar. According to the statement of these people the sands of Kizil-kum

are drifting year by year to the south, and it is feared that the north-westerly part of the Khanat of Bokhara, as far as the alluviums of the Zarafshan, will soon be covered by them."

As Krasnovodsk will undoubtedly become a great depôt for the Trans-Caspian trade, a few remarks on the route from thence to Khiva will not be out of place.

The road from Krasnovodsk follows for some distance the shore of Balkhan Bay, then enters the Kuwatagh Mountains, passing over a rocky soil covered with small pebbles to the wells of Siuili, where there is a large cemetery and traces of frequent encampments, thence the road runs almost due east, over a perfectly level ground to the wells and new Turkoman fort of Hezli-ata, situated in a hollow with a red clay soil, and surrounded by steep chalk cliffs 200 feet high. Here there is a cemetery and a mosque, the walls of which are inscribed with the names of the Turkoman dead. From Hezli-ata roads diverge in all directions, the Khiva road we are describing continues across sandy soil overgrown with grass and small bushes, to the salt marshes of Bulmudsir, and thence to the wells of Oglamish and Chagil; 35 versts from the latter place is the elevation of Begendzali-Kir, the highest point of the journey. The road continues for 10 versts over a level plateau, and suddenly descends a precipitous cliff to a salt marsh, 3 versts from the descent, in which are the wells of Kum-Sebsheng, in a hollow like Hezli-ata; the southern border of this depression is formed by the above-named Begendzali-Kir, the northern border is called Kaplan Kir, and is part of the well known Chink (edge) of the Ust Urt plateau. 33 versts from Kum-Sebsheng the road gradually ascends the Kaplan-Kir, and, after passing the wells of Kazakhli, crosses the Ust Urt for 35 versts over a hard, and therefore barren soil, to the wells of Uzun-Kui, which are remarkably deep and have excellent water; 25 versts beyond Uzun-Kui is the Chink, which is very steep here, 40 versts beyond this descent of the Chink the road approaches the large salt lake of Betendal-kul, on the shore of which are numbers of small shell-fish, of a similar description to those found at Krasnovodsk Bay, and on the shores of the Caspian. Following the north-eastern shore of this lake, the road approaches the wells of Sari-Kamish, which are but 8 versts distant from the extremity of the lake. Sari-Kamish is situated in a ravine, which, in all probability, is the dried channel of the Amu-daria (Us-boi), 100 to 150 fathoms wide from bank to bank in this part, but considerably wider near the lake where the banks are sloping; its bottom is

covered with sand, in which there is sparkling mica; in some places, as at Sari-Kamish, it is covered with a growth of underwood and deciduous trees of good size. The right bank is invariably higher than the left. The road we have briefly described is generally over rocky ground, sands, or salt marshes; the ascents are gradual, the descents, though steep, present no great difficulties; the water in the wells is slightly bitter, but is everywhere fit for drinking, and good for cooking purposes.*

Another expedition, organised by the Russian Geographical Society, is that of Kuznetsoff, to the western provinces of Russia, of which a report will shortly appear; another is Staritzky's, to the Sea of Japan. M. Staritzky's report on his researches during five years—1866–1871—in the Pacific Ocean, the Sea of Japan, the coast of Russian Manchuria, the Island of Saghalien, the Sea of Okhotsk, and Kamchatka, is very interesting. In 1868 his labours were interrupted by the disturbances caused by the Manzi in the south of the Ussuri country, which obliged him to take an active part in the defence of the country. He took a number of astronomical observations, and determined precisely the longitude and latitude of thirty-eight positions between 15° and 62° N. lat., and 120° and 160° E. long. These observations have been connected with the best Russian as well as foreign surveys in the Pacific Ocean, and have been corrected by the absolute longitude of Vladivostok, which has been determined by six eclipses of the moon, calculated by Curtazzi, astronomer at Pulkowa Observatory, and corrected by lunar observations taken the same day at Pulkowa and Greenwich, so as to reduce the longitude of Vladivostok to a second. Staritzky also conducted a series of soundings which prove the sea of Okhotsk to be of no great depth. Of sixteen soundings taken by him in different parts of this sea, the greatest depth was 350 fathoms, while the neighbouring waters are of great depth. In the Pacific Ocean, 200 leagues from the Kurile Islands, there was no bottom at 2100 fathoms; and the same result was obtained in the Sea of Japan at 1800 fathoms. In the Indian Ocean, 100 leagues from the island of St. Paul, the bottom was reached at 1650 fathoms. M. Staritzky also measured the height of several mountains, among others the volcano of Koriak in Kamchatka, which is 11,000 feet high. He discovered the port of Kinegda in the north of Saghalien

* The route thus described from Krasnovodsk to Sari-Kamish is laid down on the map published in 'Ocean Highways' for April, 1873, p. 4, from the survey of Captian Skobolef.

and the island of Moneron, which had never before been visited by a European. M. Staritzky's maps and plans have been published by the Hydrographical Department of the Ministry of Marine, and are valuable additions to the hydrography and cartography of the Northern Pacific and its coasts. Among the latest additions to the cartography of Russia is a geological map of that country by Helmersen, and part of a new map of the Caucasus, on a scale of 20 versts to the inch.

Before concluding this sketch of the progress of Russian geography, I will allude to a work which promises to be of the greatest value to geographers—the 'Geographical Lexicon of the Russian Empire,' published by direction of the Russian Geographical Society, under the supervision of Semenoff. This comprehensive work will, it is expected, be completed shortly. It contains every kind of geographical and statistical information about Russia, its mountains, seas, rivers, territorial divisions, towns, population, &c., &c.

China.—One of the most remarkable journeys performed, in recent times, by a European in China, is that of Baron Richthofen in 1871-2, from Peking through the north-westerly provinces of Shansi, Shensi, and Sze-chuen. This accomplished traveller left Shanghai for Pekin on September 27, 1871, and set forth on his long journey from the capital on the 25th of October, accompanied by an interpreter and a Chinese servant. From Peking he proceeded, by way of Kalgan, to Tai-yuen-fu; thence, traversing the whole of Shansi from north to south, he arrived at Si-ngan-fu, and afterwards crossed the Sin-ling Mountains to Ning-Kiang, near the borders of the remote province of Kan-su. From Ning-Kiang he travelled, *viâ* Kien-chau and Mien-chau, to Ching-tu, and thence to Su-chau-fu on the Yang-tze-Kiang, whence he descended the great river to Shanghai. This journey, in addition to previous undertakings of a similar kind through the central and eastern provinces of the empire, have rendered Baron Richthofen a high authority on Chinese geography and products. As a geologist and skilled observer in other departments of science, he has turned his opportunities to good use, as may readily be seen by his Report on his last journey to the Committee of the Shanghai Chamber of Commerce, which contains observations of great interest on the geography, products, agriculture, and trade of the districts he traversed. His Report is divided into sections, each supplying details of great value to the geographer, although written more especially for the information of the commercial community. The principal of these

sections are the following:—On the coal-mines of Chai-tang; on the geology of the district beyond the Great Wall near Kalgan; on Mongolian commerce and products; on the "loess," as he prefers to term the remarkable deposit of rich loam which clothes to a great depth nearly the whole of Northern China, and is the cause of its great agricultural wealth and vast population (the Baron's theory of its origin is the gradual precipitation over the face of the country, by the easterly rains, of the fine dust produced by the decomposition of the rocks and high winds); on the basin of Tai-chau and Hin-chau, and on those of Tai-yuen-fu and Ping-yang-fu; on the province of Shansi; on northern Shensi; and on the high-road from Si-ngan-fu to Ching-tu-fu.

Baron Richthofen has now returned to Europe, and it is to be hoped he will soon give to the world the results of his extensive explorations, in a form generally accessible to the reading public. I am glad to be able to add that he has communicated to us, through General Beauchamp Walker, of the British Embassy at Berlin, a valuable paper on the distribution of Coal in China, which is intended to be read at one of our evening meetings.

Africa.—*South Africa.*—Mr. St. Vincent Erskine, who distinguished himself a few years ago (in 1868) by his successful attempt to trace the Limpopo down to its mouth, has again accomplished a journey of considerable extent and danger, through a new district of South-Eastern Africa. The chief object of his present journey appears to have been a diplomatic one, the conveyance of messages and presents from the Colonial Government of Natal to the chief Umzeila, whose territory extends for a long distance parallel to the east coast between the Limpopo and Zambesi rivers. Mr. Erskine left Durban on the 25th of June, 1871, proceeding to Inhambane by sea; at which place he disembarked and commenced his journey on foot in company with Mr. Dubois. He proceeded first to the mouth of the Limpopo, to complete its examination, which had been left unfinished on his former visit. The result of his survey was the conviction that the river was navigable for fifty miles from its mouth by the smaller kinds of sea-going vessels; for, although there were formidable bars at the entrance, channels of sufficient depth existed between them, to admit with careful pilotage the entrance of ships. He subsequently visited, a little further north, the river known as Zavora on our maps—a lake-like stream, 600 yards wide in some places, but flowing through a desert, sandy country. He

next travelled to the Sabia River, through the country peopled by the Umhlenga and Mondonda tribes of Kafirs. Thence he crossed the sources of the Gorongosi, which flows into the sea between the mouth of the Sabia and the Bay of Sofala, and reached the upper waters of the Bosi, a large river whose embouchure lies a little north of Sofala. Umzeila's kraal was reached on the 22nd of March, 1872, and he started on his return journey—a long wearisome march by land *viâ* Lydenburg—on the 29th of July, reaching the capital of Natal on the 25th of October.

The main results of this important journey are a description of the vast bush-covered plains extending along the east coast of Africa from the Limpopo to the Zambesi, about 600 miles in length and 250 miles in breadth; the discovery of many large rivers, not hitherto indicated on any map; and a vast amount of curious information relating to the native tribes.

Mr. Erskine was provided with instruments for making a survey of the country travelled over, and he employed them so well that the positions of no fewer than 350 places were laid down by astronomical observation for latitude; the chief position, namely, that of Umzeila's kraal (20° 23′ s. lat.; 32° 30′ E. long.), being determined by a series of cross observations for longitude and latitude. The most northerly point reached was in 20° s. lat. He confirmed the prior observations of Mauch regarding the existence, in this part of Africa, of an extensive tract of plateau land from 3600 to 4000 feet above the level of the sea, perfectly healthy and well-fitted for occupation by Europeans. Unfortunately, Mr. Erskine's journals and records of observations, together with much other property, were lost by the upsetting of a waggon in a flooded stream, when near home, on the return journey. He has thus been unable to fulfil his intention of presenting a complete Survey Report to the Society. A journal kept in a pocket book remains, together with a map of part of Umzeila's country, on a scale of 8 miles to the inch; so that we may hope to have a sufficiently accurate record of some part, at least, of this important journey.

Dr. Livingstone.—I have been in some doubt as to the proper way of continuing my report to you on African exploration, because, although I closed my last Anniversary Address somewhat abruptly with the bare announcement, received by telegraph, of Mr. Stanley's arrival at Zanzibar, still, at the commencement of the present session I was able to present you with a connected narrative of all Livingstone's previous proceedings—in fact, with as full a

detail of the additions made through the great traveller's late explorations to our knowledge of the geography of Central Africa as we possess at present—and I am naturally reluctant to take up your time with the mere formal recital of a twice-told tale. But, on the other hand, I am warned that the Anniversary Addresses are the only permanent record of our geographical progress—intermediate reports being confined to the 'Proceedings'—and I am constrained, therefore, with a view to the continuity of the narrative, to travel over much of the same ground. I proceed, then, to record that Mr. Stanley, who parted with Livingstone at Unyanyembé in March 1872, was charged by the great traveller to bring all his journals and letters, his register of observations and rough maps—all the results, in fact, of his six years' exploration of Central Africa—to England; and well and faithfully he executed the commission. An accident, which detained him for a month at the Seychelle Islands, retarded his arrival in England until the first week in August, when our Geographical meetings were over for the season, but an opportunity having occurred, at the meeting of the British Association at Brighton, to introduce Mr. Stanley to the British public, and to make generally known, through his addresses, the brilliant discoveries which Livingstone had achieved in Central Africa, the most intense interest was excited throughout the country. We are not yet in a position to trace Livingstone's wanderings in detail, or to lay down his entire route with mathematical accuracy; for his journal has been entrusted to his family, to be kept unopened till his return to England, and his very extensive series of observations are being worked out at his express desire by Sir Thomas Maclear at the Cape of Good Hope; but in the mean time his despatches to the Foreign Office and his letters to his private friends have, at any rate, so far acquainted us with the general features of the river-system which he has been now for so many years exploring, that an outline map of Equatorial Africa has been constructed by Mr. Keith Johnston; and I have the authority of Sir Thomas Maclear for stating that the delineation upon this map of the course of the rivers, obtained merely from the bearings and distances given in round numbers in Livingstone's letters, coincides with remarkable accuracy with the positions that have been from his observations astronomically determined. Livingstone's late discoveries in Central Africa may be thus briefly summarised:—He finds the watershed between the streams running to the north and south to lie upon an elevated plateau, which stretches along the parallel of 12° south latitude

for about 700 miles from west to east, and which rises to a height of about 6000 feet above the sea-level. From the eastern portion of this table-land descend a multitude of streams which fall into Lake Tanganyika at its southern end, after passing through a sort of supplementary lake of extreme beauty, which has the name of Liemba. Further to the west the waters drain off apparently into four distinct valleys, all of which are at a much lower level than Tanganyika, from which indeed they are separated by a chain of hills, running down from the Balegga Mountains, and forming the western border to the lake. The easternmost of these valleys is filled by a river called Chambeze in its upper portion, which in the first instance runs westward to Lake Bangweolo, and then northward under the name of Luapula to Cazembe's capital. After passing through another lake, Moero, the river takes the name of Lualaba, and then flows northward in the same direction as Tanganyika, till it reaches the seventh degree of south latitude. Then it turns to the west, passing through Lake Kamolondo and skirting the Manyema country in a bend which circles round from south-west to north, until it is finally lost sight of in a reedy lake, which is supposed to extend almost up to the equator. The next valley contains the River Lufira, or, as Livingstone has named it, Frere's Lualaba. This stream is not inferior in size to the Luapula, and is believed to disembogue in Lake Kamolondo, but it has not yet been followed down, nor indeed has it been seen except by the Pombeiros, who crossed it in a canoe near its source in 1806. The third and fourth valleys are filled by the two arms of a river which is probably the most considerable of the whole system. The right arm of this river is called the Lulua and the left the Loké or Kassabi. Both of these arms were previously known; the Lulua and its numerous feeders having been explored by the Pombeiros and by Graça, while the upper course of the other arm, named the Loké or Kassabi, was visited by Livingstone himself in 1855, and was followed down by Ladislaus Magyar in 1850 to a point below the junction of the Lufira. Livingstone gave to the united streams the name of Young's Lualaba, and ascertained, while staying in the neighbouring district of Manyema, that the river, after passing through a lake called Chebungo in the country, but to which he gave the name of Lincoln, united with the eastern branches between Kamolondo and the unvisited lakes near the equator. It does not appear that Livingstone ever saw either the Lufira or the lower arm of the Kassabi, which he names

Loéki or Lomamé, but he obtained such reliable information regarding them that we need not hesitate to lay down their respective courses on the map of Africa.

Although Livingstone seems to have believed, up to the date of our last intelligence from him, that the whole of this water-system west of Tanganyika, comprising three rivers of the first magnitude, and draining upwards of 200,000 square miles of territory, found its way into the Nile, the geographers of Europe have unanimously declared against the possibility of such a connection. Not only is the bed of the Lualaba, in the Manyema country, at least 1000 feet below the bed of the Nile in the same latitude, but there are ranges of hills to the south of the head-waters of the western affluents of the Nile which completely separate the two water-systems. Indeed, a river, the Uelle, has been actually crossed by Schweinfurth, in about 3° 30′ N., which descends from these mountains, and runs north-west towards Lake Chad, thus forming a definite line of division between the two systems. Many other arguments of physical geography relating to the volume of water, the rainy seasons on the equator, and the period of flood, which have been ably put together by Dr. Bohm, and were read to our Society at the opening meeting of the session, may be held to prove, not only that the three-headed Lualaba cannot be the Nile, but that it must be the Congo, and an expedition is now on the way to verify by actual exploration this crowning point of African discovery.

The most important geographical feat which was achieved by Livingstone before he turned his steps to the sea-coast in the spring of last year, was his journey with Mr. Stanley round the northern shores of Lake Tanganyika. Up to that time he had been firmly impressed with a conviction that Tanganyika Lake was merely an exaggerated Lualaba, being, in fact, the most easterly of the valleys which collected the drainage of the southern mountains, and carried the waters northward to form the Nile. He states, indeed, in a letter to Sir T. Maclear, that he had watched for three months "the majestic flow of the Tanganyika to the north," * and records the various details of physical evidence whereby he had been enabled to verify this northern current; so that, if he had returned from Ujiji last year direct to Unyanyembe, the passage of Tanganyika into the Albert Nyanza, and its con-

* 'Proceedings,' vol. xvii., No. I., p. 69.

sequent claim to be regarded as the true source of the Nile, would have been accepted as an ascertained geographical fact. It was most fortunate, therefore, that Mr. Stanley persuaded Livingstone, before leaving the lake, to visit its northern extremity, in order to satisfy himself by ocular observation as to its northern outflow; for on the spot the travellers found that "the Lusize River flowed in, not out, and except the small lagoon called Kivo, which too, with the river of Luanda, gives its waters into the Lusize, the natives knew of no large lake to the northward." The question of Tanganyika is thus thrown back into greater mystery than ever. It cannot be an inland sea, with no outlet, for its waters are fresh, and the explanation of annual flooding, which applies to the shallow fresh-water expanse of Lake Chad and the Lake of Seistan, is inapplicable to this deep and rock-girt basin. Where, then, is the outlet? Does the water drain off by underground tunnels through the Kabogo Mountains into the Valley of the Lualaba, or is the Rufiji, which enters the Indian Ocean between the seventh and eighth degrees of south latitude, in a delta thirty miles in width, an effluent of Tanganyika? These are questions which we cannot answer at present, but which there is every reason to expect will be solved before our next anniversary.

Our knowledge of Livingstone's present whereabouts is not very definite. He appears to have been so thoroughly impressed with a belief of the identity of his triple Lualaba with the Nile that, in spite of earnest longings to re-visit his native land, he could not persuade himself to leave Africa until he had fairly traced to their sources in the southern mountains the western branches of the great river he had explored in Manyema. Awaiting accordingly at Unyanyembé the arrival of stores and supplies, which were partly furnished by Mr. Stanley and partly by our own first Relief Expedition,—no sooner had they arrived than he started, in September last, for the southern end of Tanganyika, intending from that point to visit a certain mound, in about 11° south latitude, from whence the Lufira and Lulua were said to flow to the north, and the Lecambye and Kafué to the south. From hence he proposed to return northward to the copper-mines of Katanga, in the Koné Mountains, and afterwards he wished to explore the underground dwellings in the Kabogo Mountains, of which he had heard such an extraordinary account. Later still he was bent on visiting Lake Lincoln, and following the river which flowed out of it, and which, under the name of Loéki or Lomamé, joined the Lualaba a little

further down, to the great unexplored lake at the equator. His expectation seems to have been that this lake communicated with the Bahr-el-Ghazal, and that he might thus either return home by the route of the Nile, or retrace his steps to Ujiji; but if, as we hope will be the case, either one or the other of the expeditions which are now penetrating into the interior from the east and west coast respectively, should succeed in opening communications with him, before he is called on to decide on the line of his return journey from the equatorial lake, it is far from improbable that, with the new light that will be thus afforded him, he will continue his journey along the Congo, and emerge from Africa on the western coast.

I now go on to notice the various expeditions that have been organised and sent out by the Royal Geographical Society to support and supplement the explorations of Livingstone. It will be in the recollection of the Fellows that when I delivered my last Anniversary Address I was only aware that Mr. Stanley had met and relieved Livingstone, and was then on his way to England. Shortly afterwards, however, we learnt that our own relief expedition, led by Lieut. Dawson, was also returning home under circumstances which were fully reported in my November Address. It is hardly necessary, I think, to repeat the details of this unfortunate affair. Let it suffice to say that Lieut. Dawson, under a misconception of the true state of affairs, considered it to be his duty to break up his expedition at Zanzibar, without proceeding into the interior, and that accordingly he came to England with his companions during last summer, and retired from any further connection with the Geographical Society. But the Council of the Society, although thus disappointed in their first attempt to communicate with Livingstone, were not inclined to desist from further exertions in the same direction. Acting as trustees for the subscribers to the Livingstone Relief Fund, they availed themselves of the first opportunity that offered, in the deputation of Sir Bartle Frere to Zanzibar, to fit out another expedition, which should take up and carry through the duties that had been previously assigned to Lieut. Dawson. Lieut. Cameron, of the Navy, accompanied by Dr. Dillon, proceeded accordingly with Sir Bartle Frere's mission to Zanzibar during the winter, and thoroughly equipped with instruments, stores, and supplies, has now gone up from Bagamoyo to Lake Tanganyika, where he hopes to obtain some intelligence of Livingstone's movements. The party had been further strengthened, with

Sir Bartle Frere's approval, by two volunteers, Lieut. Murphy, of the Royal Engineers, and Mr. Moffat, a grandson of the well-known African missionary, and they were already *en route* into the interior at the end of the month of March, under full instructions from Sir Bartle, which would seem to provide for every possible emergency. Owing to the dissensions still prevailing between Mirambo and the Arabs, considerable difficulty had been experienced in obtaining porters for the baggage and supplies of so large a party, and as the rainy season was also just commencing, the travellers would be exposed, no doubt, to some hardship before reaching the upper country, but they were all in good spirits; and with recovered health—for Cameron and Murphy had both gone through the usual probation of intermittent fever—were prepared to carry out thoroughly and loyally the mission on which they were engaged.

Simultaneously with these proceedings we have been organising an independent expedition, which it is intended should proceed up the Congo, in order to reach the great equatorial lakes, and thus afford Livingstone an easy means of retiring to the West Coast, should he also succeed in reaching the same point, by descending, as he proposed, from Lake Lincoln through the Lomamé and Lualaba rivers. Mr. Young, of Kelly, Livingstone's great friend and patron, was so impressed with the feeling that this exploration of the Congo offered the most hopeful means of access to Livingstone in the centre of the African continent, that he generously supplied funds for the expenses of the expedition to the amount of 2000*l.*, and Lieut. Grandy, of the Navy, is now accordingly on his way from St. Paul de Loanda into the interior, accompanied by a strong party of Kroomen from Sierra Leone, and furnished with supplies, sufficient not only for their own party, but destined also to relieve the wants of Livingstone, if he should be met with on the upper river. Lieut. Grandy will strike the Congo above the rapids that were visited by Tuckey, and will from thence proceed on a track that has never before been visited by a European, though well known to the native traders, along this mighty river to the lake from which it is reported to issue forth, and which is supposed to be identical, or at any rate immediately connected, with the lake into which the Lualaba disembogues. Lieut. Grandy has been most generously treated by the Colonial Government of Sierra Leone, through its enlightened chief, Governor Hennessy, who is himself an ardent geographer and takes the greatest interest in African discovery; and the Portuguese

authorities also, at St. Paul de Loanda, have further rendered every assistance in their power.

I shall close this brief notice of the Livingstone Relief Expeditions by referring to our resolution of last autumn, which awarded our gold medal to Mr. Stanley for the services rendered by him to geography in relieving Livingstone at Ujiji, and bringing the great traveller's journals and papers to England. The full value of this service will not be recognised till Livingstone's observations are worked out and his route is duly laid down upon the map of Africa; but we know enough to feel assured that the recent discoveries in Central Africa are not inferior in interest to those formerly achieved by our great traveller in the southern part of the continent, and that Mr. Stanley is thus entitled to the gratitude of all geographers for having rescued and brought to Europe such important materials.

Baker's Upper Nile Expedition.—The movements of Sir Samuel Baker upon the Nile have been watched with so much interest by the public, and the anxiety as to his present condition is so general and so profound, that, although his employment in Egypt is in no way connected with the Geographical Society, I still think I am only doing my duty in supplementing last year's report with such further particulars regarding him as have since come to hand. The fullest and most trustworthy account, then, which has been received of the expedition since it reached Gondokoro, in October, 1871, is contained in the following letter, which was furnished by the correspondent of the 'New York Herald' at Khartoom, and was duly published in America in last December.

"On the 7th day of November the merchant fleet reached here, comprising ten sail, owned by Mohammed Akad, who is the sole proprietor of the ivory establishment situated south of Gondokoro. The expedition brought tidings from Sir Samuel Baker that you will perhaps regard as more precious than ivory. Baker himself has not written a line either to Europe or to the Egyptian Government so far as I can learn. I, therefore, can only report what I have patiently gathered from the men who have seen Baker in the equatorial regions. Although they come direct from there and from association with him, the reports must, until further advices, be received with a certain degree of caution.

"When Sir Samuel Baker took his departure from Khartoom in January, 1870, he entered into a contract with the Sheikh Mohammed-el-Akad, stipulating that the exploration between Gondokoro and the Albert Nyanza should be undertaken on joint account, the proceeds realised from the sale of ivory to be divided in the ratio of the number of men furnished by either of the contracting parties. Akad agreed to furnish men for transportation purposes, and to furnish the necessary provisions for Baker's soldiers. Akad's portion of

the expedition was placed under the command of his son-in-law and partner, Abu Saut. But before the expedition had even reached Gondokoro, dissensions arose. The Bari—negroes employed as carriers—revolted and ran away, thus leaving the expedition without the necessary transportation. Baker accused Abu Saut of complicity in the desertion of the negroes, and favouring and encouraging that dissatisfaction among them that led to the desertion. Abu Saut is certainly a great favourite with the negroes, and much respected by them; but this is hardly sufficient reason for supposing that he would provoke revolt to his own injury.

"On Abu Saut's arrival at Gondokoro, Baker would not permit him to unload his boats at the bank of the river, but compelled him to confine himself to an island at the opposite side. Time, however, was pressing. The Egyptian troops, with Baker, had been already detained several months, and now with an open quarrel on foot, the only prospect was one of indefinite delay. In this position Baker found himself forced to make what use he could of Abu Saut's influence in the country, and through him negotiated for a new party of negro carriers. He was thus enabled to proceed towards the equator with 200 soldiers, leaving the remainder of his forces and all his baggage at Gondokoro under command of Col. Rauf Bey.

"For several years past Akad has been in possession of several trading stations in the equatorial regions—namely, at

"1. Farschelé, in the district of Medi, six days' march from Gondokoro.

"2. Faló́ro, three days' march from Farschelé (see Map).

"3. Fabo, eight hours south of Faló́ro (see Map).

"4. Fatuka, in the district of Fadjuli, eight hours east of Fabo. (On Baker's map it is called Fatiko.)

"5. Fauér (Fauira on Baker's map), situated on the Bahr Magango (the Nile), in the district of the Faloa tribes, four days from Fatuka.

"6. Musindi, residence of King Kamrasi, five days south of the river Magango.

"All these establishments had to be inspected by Abu Saut, and therefore he went on ahead of Baker, and visited Musindi, where he found that Kamrasi had died, and was succeeded by his son Kabrega. The latter proved an old acquaintance of Abu Saut, who was therefore received with much consideration. Kamrasi's tribe is of a higher state of culture than the negroes of northern tribes. Nakedness is prohibited—all are clothed. The residence of the king is highly ornamented. The roof rests on ivory pillars, the walls are covered with silken and woollen stuffs, and the floors well carpeted. These luxuries are provided by traders from Zanzibar, who have a station three days' journey south of Musindi, situated in the district of Magango, the chief of which is Kamrasi (?). The proprietor of this trading station is Isa Mansur, who, like all his companions, believes in Islam. He can command 800 muskets. The traders of the Indian Ocean and the ivory traders of Central Africa meet each other at Musindi, and from this point there is four days' journey in a western direction to the Albert Nyanza. In this district Abu Saut has been in the habit of annually bargaining for about 500 cantars of elephants' teeth, and during this season has returned, as usual, with a large cargo to the station at Fabo.

"Baker arrived at Musindi subsequently to Abu Saut's visit, and doubtless there had been reference to Baker in the conversation of Abu Saut with Kabrega, the king, for the latter was informed of Baker's coming and of his purposes. He remained quiet, but jealously watched the movements of the expedition. The goods which Baker brought with him were unpacked and exhibited in his tents. The natives, invited by Baker, came to exchange ivory for the goods. In a short time small quantities of elephant tusks had thus been bartered for. The natives were much surprised that Baker—

who, on his first visit, was satisfied to live, as they did, on 'melochies,' a wild-growing vegetable, simply boiled in water—now bore the dignity of a Pacha. The notion of the natives, it should be remembered, is that there exists no greater king than either Kabrega or Kamrasi.

"One day King Kabrega regaled the Egyptian soldiers with a drink called 'merissa' (a beverage distilled of corn). All drank, and drank to excess. The men fell sick and fainted, the symptoms appearing dangerous. Remedies were promptly applied, and fatal consequences averted. The 'accident' had been caused by one of Kabrega's courtiers, and Baker, highly incensed, demanded the culprit to be handed over to him. This was refused, whereupon Baker ordered a bimbashi (that is, a captain) to go, accompanied by two soldiers, to fetch the culprit, if necessary, by force. Now, a negro never permits force to be used without taking revenge. When the soldiers came to fetch the courtier, they were attacked by the natives and all three were killed. This, of course, was the signal for a general attack. Baker declared war, and on both sides the fire was opened. The issue did not remain doubtful very long. Kabrega, in addition to an army of Lancers, has 200 muskets. Thirty soldiers fell, and Baker was compelled to give way. He retired before an overwhelming force, leaving arms and munition, as well as the ivory, tents, and all he possessed, to be consumed by fire, in order to prevent their falling into the hands of the enemy. In his retrogade movement Baker was pursued and harassed during five days, until he reached the River Magango. Arriving there he remained twelve days before he was enabled to cross the river, no ferry or boats being procurable. Baker attributes this disaster to the intrigues of Abu Saut.

"At Fatuka there is the largest trading establishment owned by Akad, and here Baker demanded that the servants, under whose protection rested Akad's establishment, should henceforth take allegiance to the Egyptian Government, the contract with Abu Saut having expired. The districts over which Abu Saut traded must be thrown open, and Baker Pacha sent for the Vakil of the Seriba (chief of the station), named Weled-el-Melik, 'son of the king.' This person sent two of his men to apologize for his non-appearance, owing to sickness, and to take the orders of the Pacha. This circumstance confirmed Baker's suspicion of an intended obstinacy on the part of the Turkish Rajah (?), and of a refusal to obey orders. A tumult ensued. The negroes belonging to Baker's expedition joined in the *mêlée*, and attacked, subsequently, the Seriba of Akad. Before the men of the latter could take means of defence, several persons were killed. The Danagla (men of Dongola) took to arms, and fired on the coloured men. Baker's forces opened fire on the traders, who, following the orders of their chief, did not fire on the Egyptians, but retired. About 130 men, Berbers and Danaglas, fell in the fight. The trading station has been taken possession of by Baker, with all the goods, munition, stores, and also 300 donkeys.

"Abu Saut, who during the occurrence was at Fabo, has received from Baker a letter stating that the Danaglas provoked the fight, and that he was thus compelled to punish them. When Abu Saut reached Fatuka endeavours were made to induce him to acknowledge the fact that the responsibility of the occurrence rested on the trading association. This he refused, believing that the evidence given by his own men proved the contrary. Baker Pacha was, in consequence, induced to call in the man Weled-el-Melik, and to instal him as chief of the entire trading establishment. A circular was sent to the other branches, and the forces were ordered to swear allegiance to the Egyptian Government, and to serve it henceforth. The Nubians held councils among each other, and informed the Pacha in writing that they remained loyal to their former master, and that force would be met by force.

"Under these circumstances Abu Saut resolved to abandon the country,

and to return to Kbartoom. Owing to the warlike preparations be was unable to secure men for tbe transportation of the 1000 cantars of ivory, whicb he left behind at tbe Seriba of Fabo. The 400 men left in cbarge have received orders not to fight in case of an attack being made by the Pacha, but simply to abandon the Seriba and the ivory, to take to the boats, and return to Gondokoro.

"Tbe trading enterprise of Akad is thus interfered with, and Abu Saut proposes to go to Egypt, with the view of personally reporting to the Khedive.

"Regarding Sir Samuel Baker, whose contract expires very soon, we can form no idea. Whetber he will renew the expedition, or whether he closes his mission at Fatuka, and returns *viâ* Gondokoro and Khartoom, all is conjecture. In the mean time Mr. Higginbottam, the engineer, bas mounted the movable steamer destined to explore the Albert Nyanza. Mechanics and machinists have been busied at Gondokoro, and we conclude that operations will now commence."

This letter is penned in a spirit evidently not favourable to Sir Samuel Baker, and its statements, therefore, coloured as they are, must be received with some reserve; but there is no reason to question the accuracy of the geographical details, in so far as they concern the movements of our countryman upon the Upper Nile. Baker has not penetrated further south, it would seem, on this expedition than about 1° 30′ of north latitude, nor has he been able to re-visit the western lake which he discovered on his previous journey. The statement, at the same time—if it is to be so understood—that the steamer has been put together at Gondokoro, is very puzzling; for it would be impossible to take the vessel up the cataracts and rapids south of that point, so as to launch it on the lake; and the great object of the expedition, as far as geographical discovery is concerned, would thus seem to have been given up. In regard to the all-important question of Baker's personal safety at the present time, it is satisfactory to know that a succouring party of several hundred men, under the military Governor of the Soudan, left Khartoom during the winter, and had arrived at Gondokoro by the 15th of March; so that there is every prospect of our countryman being soon extricated from his dangerous position at Fatuka, even supposing—which is hardly probable — that Mr. Higginbottam has not at an earlier period brought up reinforcements to his relief. I take this opportunity of further announcing—what is not generally known—that Sir Samuel Baker's engagement with His Highness the Khedivch terminated at the close of last year; and that the American officer, Colonel Purdey, who was reported to be charged with the duty of leading a relief party from the east coast of Africa by Kilima-Njaro and the Baringo Lake to the country of Kamrasi, has been, in reality, entertained with a view of succeeding to the

command of the expedition on Baker's retirement. Colonel Purdey's party, which is said to be efficient and well equipped, is still, however, detained at Cairo, the idea of its entry into the Upper Nile basin from the east coast having been definitely abandoned, while its journey to Khartoom and Gondokoro, either now or later in the year, is dependent on the intelligence that may in the mean time arrive from the upper country.

Conclusion.—It remains, gentlemen, that I should now say a few words on my retirement from the honourable position to which you elected me two years ago, and the duties of which I have ever since endeavoured to discharge to the best of my judgment and ability. To say that these duties are not sometimes onerous, and even painful, would not be true. Undoubtedly they involve very considerable labour and no small share of responsibility. It is impossible, indeed, for your President to conduct the affairs of a Society numbering 2700 Fellows, however cordially and efficiently he may be supported by his Council and Executive Staff, without occasionally being guilty of saying, or not saying, something that gives offence, and thus reacts unpleasantly on himself; but, at the same time, the office of President of the Royal Geographical Society is one both of honour and of power; and affording as it does the means of adding both to the knowledge and happiness of mankind, it must ever be an object of ambition to those who take an interest either in the promotion of science or the conduct of public affairs.

The rules of the Society, at the same time, have hitherto prescribed that the President shall only hold office for two years, and shall not be eligible for immediate reappointment, and although in the case of our late President Sir Roderick Murchison, who was so specially fitted for the position both on scientific and on social grounds, the rule was habitually violated, still it was felt by myself and by the Council that our laws could not be disregarded in the case of another President not similarly circumstanced, without to a certain extent discrediting our Institution, and I prepared accordingly some months ago to resign my functions at the Anniversary Meeting into the hands of a successor. I must also, to avoid misconception, state that the Council were kind enough, notwithstanding the manifest inconvenience of such a course, to propose again to suspend the law in my favour—and prospectively the restriction has now been actually removed by your vote of this morning—but after three years' experience I had found the demands upon my

time and attention which the conduct of your affairs imposed upon me to be so excessive as to interfere seriously with my other necessary occupations; and I have therefore judged it absolutely indispensable to solicit an interval of relaxation. In accordance, then, with the law, and with my own wishes repeatedly expressed, the Council proceeded to consider the somewhat difficult question of appointing another President, and their choice fell upon Sir Bartle Frere, who has already on many occasions presided over our meetings, and who has every qualification necessary for permanently holding the high office in question, if you should be pleased by your votes to sanction the recommendation of the Council. Sir Bartle Frere has been already communicated with upon the subject, and although his views cannot be known for another week or ten days, when his arrival is expected in England, still there is no reason to anticipate that he will be disinclined to accept of so honourable an office; and in the mean time—that is, pending his decision—I am prepared to continue to watch over your interests. With my best thanks, then, for the support which the Fellows have always afforded me, I now take leave of you as President, and ask your indulgent consideration of any shortcomings you may have observed during my tenure of office.

Postscript.—As these sheets are passing through the press, we learn by a telegram from Alexandria that Sir S. Baker, with his wife and nephew, arrived at Khartoom from Gondokoro on the 29th of June, having succeeded in suppressing the slave trade on the Upper Nile, and having brought under the authority of the Egyptian Government the country east of the Albert Nyanza to within 4° of the equator. The most interesting piece of geographical intelligence which is contained in this telegram, and which is said to be given on the authority of Sir S. Baker himself, is that, after all, the Albert Nyanza and Lake Tanganyika are one and the same body of water; a vessel launched on the river above the Murchison Falls being capable of passing direct by Baker's Lake to Ujiji on the eastern side of Tanganyika, a distance of over 700 miles. This, however, is so entirely opposed to the results obtained by the personal observations of Stanley and Livingstone, that, pending its confirmation by Sir S. Baker, and a full explanation of the grounds upon which he has come to such a conclusion, I cannot recommend the statement to the acceptance of geographers.

July 10, 1873.

PAPERS READ

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I.—*On the Gāro Hills.* By Major H. H. GODWIN-AUSTEN, F.R.G.S., Deputy Superintendent, Topographical Survey of India.

[*Read*, November 25th, 1872.]

THE Assam Valley, having the Bhutan Himalaya on the north, is bounded on the south by a broad mountain-system 4000 to 5000 feet high, emanating orographically from the hills north of the Burmese provinces, and connected with the main Himalayan system on the longitude of 96°–98° E, by the water-parting of the Brahmaputra and the Irrawaddy. For 190 miles it has a direction from east to west, and a mean breadth of 72 miles, and is known successively as the Naga and North Cachar, the Jaintia, the Khāsi, and the Gāro Hills, as it is in this succession inhabited by the people of the above names.

The Gāro Hills, of which I am about to speak, form the extreme western point of the system, extending west for 60 miles, from long. 91° to 90° E. Ascending the Brahmaputra from the delta, the Gāros are the first hills that break the horizon; and although the British Government have been in possession of all the surrounding plain country for many years, since the annexation of Assam, it was only in 1867 that a British officer was appointed to the charge. Previous to that the intercourse with the people was of a very limited and unsatisfactory nature. A few attempts to enter the country had been made, but prematurely brought to an end by the sickness of the European officers and the difficulties of carriage; so that even in 1870 no European officers had penetrated far into the interior and

independent villages, or had ever crossed the hills from Mymensing to Gwalpara.

The area inhabited by Gāro tribes is about 2300 square miles, and the new civil station Túra is on the western side overlooking the south bend of the Brahmaputra. I have given these introductory remarks upon the geographical position of the Gāro Hills, in order that those not familiar with the minor subdivisions of our Indian empire may form a clearer estimate of their position on the map of India.

The line of longitude 91° may be taken as the boundary between the hills inhabited by the Khāsi tribes on the east, and the Gāros on the west; the strip of almost uninhabited forest and jungle that lies roughly on this line separates these two hill peoples, and though only some 18 miles wide, is a complete barrier between tribes differing so widely from each other in appearance, manners, customs and language; and intercourse between the true Khāsis and Gāros is very limited.

Dwelling intermediately between the Khāsis and Gāros, we find a small clan called Migams or Langams (who are not true Khāsis), speaking a dialect of their own. They are under the Seem of Nongstoin, have a knowledge generally of the Khāsi language, and frequent regularly the "haths" or markets in Nongstoin; they in some respect resemble the Khāsi, but in dress and customs are Gāros, and like them cultivate cotton; yet they never intermarry with the true Gāro, and there is but little intercommunication. They are a quiet civil people, "joom" cultivators, and build their houses raised off the ground 2 or 3 feet. The Khāsi custom of setting up monolithic stones is not practised by these Langams, whose funeral ceremonies are quite different, and resemble those of tribes of Bodo extraction. My first intercourse with the Langams was in the field season of 1866–7, when the survey was carried up to the line of longitude 91°; the only Gāros met with at that time were those living on the outer southern slopes of the hills, and who turned out and gave very willingly all aid required of them. In the autumn of 1869, having learnt from Capt. W. J. Williamson, the Deputy Commissioner of the Gāro Hills, that he was prepared to give every assistance in his power, should we take up the survey of his hill country, I determined, there being little prospect of our obtaining the same cordial aid on the Cachar frontier, to throw the main strength of the party into the unknown area west of 91°, and to extend the triangulation along the southern face of the hills. The party, therefore, on the 16th December left Chatar, after the usual trouble and annoyance in obtaining boats. The heavy baggage and tents were to proceed by water down the Soormah, and through the many

navigable streams into Shūshang, while Lieutenant Beavan and myself, leaving the boats at Sonamgunj, were to march, viâ Laor, to Puna Tith on the Jādūkatta, to visit Nongkulang, and take up the triangulation there. I also wished to examine the ground near the debouchment of the Um Blay, surveyed in previous seasons.* The hills are well seen from Laor, the fine mass of Maolangten rising abruptly to the east of the Jādūkatta; this wall-like line of mountain, broken by the deep gorge of the Um Ning, is the western extremity of the high Khāsi plateau, the fall in the hills being about 2000 feet, the valley of the Um Blay marking the lowest part in the whole east and west range of these hills. On the 19th we only got the short distance of 2 miles, from the Police Thanna to Ilampur;† for the only way of getting to Puna Tith being by boats, the necessary number could not be procured in one day. So we employed ourselves shooting small birds in the jungle near the village. This was situated on the edge of a fine wooded belt running away from the hills on the right bank for some miles, and covering a higher level of boulder and clay deposit 20 feet or so above the level of the plains.

Stychyris ruficeps was very common in this jungle, and I shot several specimens. Plenty of boats were ready by the next morning, and in them we ascended the river; the entrance to the gorge, and for 4 miles up the river to Puna Tith is one of the most beautiful scenes I have ever passed through. The secondary sandstone, in thick beds, is the first rock seen as the gorge is entered, dipping southward at about 25°, the harder beds running out with the strike of the strata from the river bank. When the gorge is fairly entered, and near the junction of the first large tributary on the left bank, the strata are nearly horizontal, and form high cliffs on the right bank; above this again, trap occurs, and the river has cut a very deep channel through the mass, which rises perpendicularly on both sides for some 200 feet.

The river is here very deep and perfectly still, and the reflections of the richly coloured dark green rocks capped with trees and foliage, as we saw them about sunset, were most

* The bazaar at Puna Tith is a very large and well-known one. We were short of good porters, and I was in great hopes that we might pick up some recruits among the Khāsis coming down from the villages in the hills.

† In Laor and Ilampur, very large quantities of fish are taken in the river and bheels near. These are dried in the sun and packed in bundles for the hill markets; in this state it is called "sūkti,' and is a favourite article of food of the Khāsi and Sinteng. Its smell is naturally very strong when stale and old. The village of Ilampur was a very smelly place; near every house was a platform, with posts all round it, on which were drying hundreds of fish, the larger hanging on strings, the smaller placed on bamboo mats. Nets are spread over the whole to keep off the crows and kites.

lovely. During the day I had a long search for fossils in the secondary sandstones, and followed a large tributary up to their junction with the trap; so that the day was nearly spent when we reached the site of the market-place at Puna Tith, situated at the junction of the Rilang with the Um Blay; the place consists only of some half-dozen houses, inhabited by Khāsis, and the bazaar is held on the bank of the river. This presented a very lively appearance the next day; boats were constantly arriving, laden with "sūkti," plantains, rice, &c., from the plains, and generally manned by Bengalis. Long lines of Khāsis, from villages up near Nongstoin—men, women, and children—wound down the zigzag path, running upon the steep spur behind the village. Some few of these people brought lac and india-rubber, but they were generally empty-handed, returning with heavy loads of the sūkti.

My sirdar was busy looking up recruits, and got some 20 men to take service at Rs. 9 a month. They had a curious plan here of keeping the large turtle, tethering them in the water near the landing-place by a strong rope fastened to their hind legs, and thus keeping them until bought by some hill men going in for a feast; one we saw fastened in this way was a remarkably fine specimen of *Trionyx Gangeticus.* We had several things to provide, principally rice for the camp-followers, which was laid in for our onward march; and with the new coolies (porters) in addition to those we had started with, we were now well off for carriage. Failing to get axes, a man was deputed to obtain some at the village of Nong-shing-riang, near Nongstoin. The Khāsi iron is excellent, and the axes made at the above place are in form peculiar to this part of the country; in the hands of an expert woodcutter they do excellent work in jungle clearing; the iron is soft, but admits of being readily ground to a fine sharp edge, which will bend but never chips off.

Another form of axe used by the people of these hills is in shape similar to the stone celts found in Burmah, Munipur, &c., formed generally of jade; this chisel-shaped piece of iron is wedge-shaped at the head, and is fitted into a hole in the root end of a bamboo, where the wood is particularly tough and close grained. By this method it has the advantage of being either set with the edge at right angles to the handle and used as an adze, or in a line with it and used as an axe. With these axes they fell the largest trees very rapidly.

The villagers living on the skirts of the forests, and particularly those who annually clear fresh forests for their cultivation, are most skilful woodsmen; it is quite interesting to see the clever way the trees are selected, then partially cut through,

and a number all brought down together, by one or more trees being made to fall upon them. From Puna Tith we crossed the river Um Blay to the western bank, and a stiff ascent of 500 feet immediately follows, up the very scarped hill-side, in the secondary rocks. A very pretty fern grew in abundauce around the stones and large boulders in a ravine bed, and I found it afterwards very common in like situations in this part of the hills, up to the Sumessary Valley. Reaching the edge of the scarp we passed through some undulating ground, covered with a not very dense copse-like growth, and gradually ascending, emerged out of it upon the flat open plateau, extending to Nongkulang hill. The surface is a hard sandstone of the upper cretaceous series, of precisely the same nature as that at Cherra Poonjee; the soil has been washed off the greater portion, and the streams flow over the surface to the south, in very shallow water-courses, the only trees and vegetation growing along their banks. These streams discharge their waters with very fine falls into deep ravines, which have been cut back far into the plateau, through the softer beds below. Into these ravines, bounded by cliffs some 300 to 400 feet deep, it is almost impossible to descend, and the bottom is a mass of the densest forest growth.

We encamped on the open plateau near a stream where we found a sufficient depth of earth to drive the tent-pegs, and our men got very comfortable quarters in the jungle near the water. I was very fortunate to obtain, on this day's march, a very fine specimen of a rather rare eagle, *Aquila hastata.* When the halt was made for breakfast I took the measurements, while Lieutenant Beavan made a sketch of it to be coloured in camp. It was then handed over to one of the Khāsi coolies to carry, but we never saw it again, for on calling for it the next morning, some of them had cooked it the previous evening, not knowing that it was wanted.

The next day, the 23rd, we continued our march westerly along the plateau, which retains the same character with a very gentle fall, with the dip of the strata southward. Near the Langam village of Maomāsi, the nummulitic limestone commences, and fine forest covers the Nongkulang ridge, save in the more level spots, which have been cleared, and form very productive land for cotton and hill rice grown during the rains. The forest scenery is fine over the northern face, giving a dense shade over the ascent to the highest point, where I had placed the station in 1866. The glades were cool, and the limestone rocks damp and covered in places with magnificent ferns.* Of the old platform built by me in the winter, 1866–7,

* Species of *Sagenia* and *Goniopteris, Pœcilopteris repanda* and *vittaria.*

very little was to be seen; the wood was quite rotten, and the jungle which I then cut down to within 2 feet of the ground, was now of great height, and shut out everything, so that we had plenty of work to do over again, and this was commenced upon immediately after camp was pitched on the site of the old village. As an instance of how village sites constantly change—in 1866 this was a large one of some 12 houses, and very substantially built. These were now all down and buried in high grass; so that to have a clear camp and pitch the tents we had to burn it, which was soon done in its then dry state. The people had in the interim moved twice, building their first village some 3 miles farther west; this they had to leave after the first year, the site proving so unhealthy, and they were then, 1869–70, living still farther away. Even the most productive clearings they seldom cultivate and live on for more than four years. On the 24th and 25th the work of clearing and building the platform round the trigonometrical station was continued, and men were started off to set up the marks and show heliotropes at Landekar, Kokhlam, Marangthang, &c., so that the observations might be commenced. It was getting more hazy every day, and it was with great difficulty that distant marks could be discerned. On Christmas Day I employed myself drawing some birds I had shot, and broke up a large quantity of the fossiliferous sandstone of the Nongkulang hill, while my fellow-surveyor, Lieutenant Beavan, was engaged in looking over and drawing some new fish which he had collected.

Lieutenant Beavan now knowing what had to be done in the surveying line about here, I left him on the 26th, to meet the head-quarter camp in the Mymensing district. I proceeded to the foot of the hills at Bagholi, viâ Purjonkha; the road lies through forest nearly the whole distance, and from Purjonkha to Bagholi is over a slope of the nummulitic limestone, very rough and tiresome walking. The only good water is to be had at Purjonkha, where I breakfasted by the side of the pretty shallow brook. The Polyplectron pheasant is very numerous about here, and they were heard calling in all directions in the early morning. The beautiful *Irena puella*, or fairy bluebird, sat in numbers upon a bare tree near the breakfast place: this bird is one of the most lovely of our Indian avi-fauna, but does not extend into the Western Himalayas. Around Nongkulang I collected several good birds; among them, *Trichastoma Abottii*, Bly.; *Turdinus brevicaudatus*, Bly.; *Pomatorhinus hypoleucos*, Bly.; and *Zoothera marginata*, Bly.; the damp limestone rocks, abounding in shells, and the fine forest growth, renders it a capital locality. At Bagholi, the

drainage from the Purjonkha valley, after being lost in the limestone rocks, reappears in a large still stream just within the hills; its volume I am inclined to think is greatly increased by the water of the numerous large streams that descend from Yindkú, Kutabram, &c., which are all lost in the limestone there. The stream that issues at Bagholi, the Gabir, is too large for the drainage area of the little Purjonkha rivulet. From Bagholi, I skirted the base of hills to Gillagora, and encamped there about half a mile from the foot of the last spurs.

The hills here are of the supra-nummulitic series, and dip at a high angle towards the plains, the dip decreasing northwards. Their appearance is identical with some portions of the Sivālik hills in the north-west of India, and their age is probably near that of the lower division of the Sivālik formation, or the Nahan group of Medlicott. These hills are rather more open than we find the outer slopes further east in the Khāsi country, owing to the clearings that have been made. On the steeper southern slopes, the forest once cut down, and on the cultivation being given up, is succeeded by a rank grass, which hinders the growth for a long time of any trees; this grass is fired every spring, which prevents, more than anything else, the growth of such seedlings as may spring up. Owing to the high angle of dip, the last spurs terminate in very steep slopes upon the plains, and in places the marshes commence at their very base—the alluvial deposits are thus found bedded against the older rock, and there is no slope of talus whatever at the base of the hills. The hill streams, such as the Rongsiang and Mahadeo, are sluggish far up above their debouchments, and are navigable for canoes, showing very clearly that a local depression has been taking place over this area in very recent times, which is marked by the large extent of marsh and open water exteuding from Nazirpur (in Mymensing) into the Sylhet district, and marked also by the very sudden falls in the Oobdakalee River near Nazirpur, to the west of which there is a marked rise in the whole country towards the Brahmaputra. On the 27th I marched to Bamangaou, situated in Mymensing; the weather was lovely, and the hills very clear, so that I could cut in the position of new points as they came into view, and roughly select those for future stations of trigonometrical extension. Bamangaon is situated on the edge of a vast expanse of very low country covered with high grass in the winter season, intersected with muddy drainage ways, and dotted with a few ponds, but quite under water during the rains. This expanse of grass is the western extension of the marsh and open water above mentioned. The "Kyah" partridge, *Ortygornis Gularis*, Temm., was very numerous along the edge

of this marshy tract, but very difficult to put up without dogs. Their loud peculiar call was heard on both sides when we got up and struck the tents at sunrise on the 28th. The dew that falls in these marshes at this time of the year is very heavy, and a dense damp mist hung over the low country, through which the sun's rays strove to penetrate. Soon after leaving Bamangaon the River Gonassery is crossed, here a shallow, broad stream, with sandy banks about 12 feet high, and we reached Nazirpur, a large "hath" or market-place, by 9 A.M. From this the fine peak of Kylas was well seen, and I looked at it long and anxiously. The highest point in the Gāro Hills, it is looked at with interest, even veneration, by the people of the plains; by the Gāros it is called Chikmŭng, and is the last resting-place of the souls of all the race. Various wild stories are in circulation concerning attempts often made by people from the plains to ascend to its summit. The Gāros themselves consider it haunted, and sinful to climb it and so disturb the manes of their ancestors. I stopped to breakfast in the hath of Nazirpur, and while waiting, my Hindustani calashies discovered a fellow-countryman, holding an appointment under the Shūshang Zemindar; this man brought me a present of fruit and some milk, and we opened a conversation. He of course had heard of "compāss walas" and the conversation naturally led up to the peak of Kylas, which we informed him we were soon bound for. He held out very little hope of success; for besides the opposition that he said would be offered by the Gāros, he told a tale of a fakir, or holy man, who had made a vow to pay a pilgrimage to the summit of Kylas, and who for that purpose went as far as the village near, where he put up for some time, and made a number of unsuccessful attempts; but that after getting nearly to the top on every occasion, his legs seemed weighed down, and he was thus prevented at last from making a single step forward, and that all grew dark around him. The Gāros themselves, and the people of the plains below, all said that any man visiting the "Holy Hill" would be sure to fall ill and die soon after. I laughed, I fear, rather ironically at his tale (although I am quite sure many of my men believed there was something in it), and told him that he should soon see our heliotrope flashing from the highest point of it. Seen from the plains near Shūshang, Kylas has a most imposing appearance; it rises abruptly above the mean level of the range, of trapezoid form, its upper surface sloping gently to the east; looking from the west of Shūshang, its shape is that of a truncated cone. The south and west face is almost perpendicular and consequently bare, and its horizontal stratification is apparent, in bright contrast with the

dark forest of the hill slopes below and around; its extreme western and highest part was evidently covered with grass, and this I decided should be the site of our trigonometrical station. The whole line of its flat summit showed that forest grew up to the edge of the southern slope.

After breakfast I parted with my friend, the Zemindar's official; reiterating my promise that he and all the country round should see our heliotrope, and to be on the look-out for it, we parted, he ominously shaking his head and quite convinced that if a fakir failed to get up, we certainly should.

From Nazirpur the march was continued to the left bank of the Sumessary River, and we followed it up towards Shūshang, as we expected to find there some news of the main camp, under Mr. Belletty's charge; we soon met a man of the establishment, who told us the boats were a short way down the river, but detained by a fall where the water was very rapid, and that they would get up as far as they could that evening. Nazirpur was centrally situated, with a fine large market twice a week, from which we could obtain all our supplies, and would also be within my proposed triangulation. I determined at once to form the first head-quarter camp there, under some fine mango-trees, scattered along a piece of ground raised slightly above the surrounding low marshy land, and giving shade and a dry position in wet weather. The 29th saw the whole of our luggage transferred from the boats to this site, and camp pitched; the Khāsi coolies putting up temporary shelter for themselves near.

I did not leave for the hills until the 15th of the following month (January), but much was done in the interval. Men were sent off to clear the hill of Wajong Korong under Mr. Doran, and to set up flags at other points. Mr. Belletty prepared his plane-table for the triangulation of the country west of the Sumessary, and started on the 4th of January to select and clear the hill of Joksangram, north-west of Shūshang, a fine commanding point forming a triangle with Kylas. Mr. Atkinson came in from some work at the base of the Khāsi hills, and was sent off with a fresh plane-table to sketch the ground west of long. 91°. Official correspondence, and the regulation of supplies for those going out and the main body in camp, gave plenty to do. On the 3rd I walked over at 7 A.M. to Shūshang to see the collector of the Mymensing district, to arrange with him about purwanas, or orders for supplies and assistance from the head-men of the villages bordering the hills. The collector had departed with his elephants shooting in the bheels near, so I had my walk to no purpose; he, however, came over on the morning of the 6th, and asked me to accompany him, as he was

going to beat the expanse of open grass country to the east. I was glad of the opportunity of thus reconnoitring that part, which I should otherwise have had to do on horseback and foot, entailing immense labour; for very little or nothing can be seen, save from the back of an elephant. I was thus able during the day to select a good point near the village of Lukhipur, on an artificial mound, which had once been the site of a village. The country was so flat, and the waving sea of grass so high, I was unable to get a ray longer than 4½ miles in this direction. A few wild buffaloes are to be found in these marshes, but not many at this time of the year, and there are a few deer, but it is very difficult to see them in the high grass; pigs seemed numerous.

On the 7th, the building of the station close to camp was commenced upon, and an elevated platform of bamboo had to be erected, in order that the heliotrope might clear the grass on the Lukhipur ray. I could see that Mr. Belletty on one side, and Mr. Doran on the other, were hard at work clearing their respective hills, by the gaps that were being made in the forest that covered them. On the 10th I proceeded to Lukhipur, to observe at the station there; found that the platform on level of ground was not high enough; the flag above Nazirpur mark could just be seen through the theodolite, but not the heliotrope; so a platform had to be run up of bamboo, fine clumps of which grew in the village of Gouripur, and we proceeded at once to cut down sufficient for the purpose, and by evening had very nearly completed our task. I pitched tents in the village of Gouripur in the evening on returning from work, as my men thus got shelter in some of the houses. This village was a good specimen of one in this swampy part of the district, built upon an artificial mound and surrounded on all sides by marsh and rice cultivation. To the north was a large open piece of water, and this swarmed with ducks, geese, and every kind of waterbird, whose cries were heard far into the night as we dropped off to sleep. The next morning we were astir at dawn, and off to the mark again, and had it finished ready for observing at by 10 o'clock. Marangthang mark showed well, and I got all my angles recorded by 4 P.M., in time to return to Nazirpur. The day was most lovely, cool and bright, and the hill range of the Gāros beautifully sharp and clear; it was one of those days and evenings in the cold weather that the European in India looks back upon, when he picks up renewed health and strength, with the happiness the pure temperature (so rarely experienced) imparts. Bagged a brace of teal on the way back; there is good shooting about if one had time to go in for it. My assistant, Lieutenant Beavau, was now brought

into camp very ill with fever and a touch of sunstroke; he had, after I left him at Nongkulang, selected a station on the hill of Pundengroo, and was encamped there clearing it, when the attack came on; he stayed there as long as he could, but at last had to give in, and return to Head-quarter Camp for treatment. Thus was much valuable time lost, and his services—for I had eventually to go and finish his work at Tigasin and Marangthang; but it is impossible in these hills to depend on the health of any man, and plans are constantly upset thereby. Lieutenant Beavan having had a similar attack in the previous field season, when working in the North Cachar hills, and well knowing that such further exposure would probably kill him, I determined, much against my own wishes, but solely for the good of the service, to draft him to some other more healthy part of India, and I eventually sent him forward to Mymensing for Calcutta.

Nazirpur is situated about 5 miles from the base of the hills; the intervening ground immediately north is rather higher than the rest of the country, and is dry and open, so that there is an uninterrupted view of the hills down to their very base, where a dark line marks the site of several large villages nestling amid luxuriant trees and fine bamboo clumps. The hath, or market, is a very considerable one, and frequented largely by the Gāros; these people are extremely timid of strangers, and the first market day after the survey camp had come in, a number of these people seeing my chuprasies about, bolted off at once. They have good cause, no doubt, to fear a "chuprasie"* in the plains, for they have very frequently been robbed of their goods, and made prisoners of, by the retainers of the Shūshang Raja; and if not by his orders, certainly winked at by him. I have no doubt that many raids by these Gāros on the people of the plains have been brought about by such acts, which they, like all hill people, are not slow to revenge. Confidence once established, they soon came to the market in their usual way, and eventually supplied the whole camp with firewood during our stay at Nazirpur, for which they received regular payment.

It is only the outer Gāros who come thus far into the plains to market; the interior Gāros very seldom venture out so far, and depend on the former, their neighbours, for all luxuries they require, and transmit their cotton to the plains by the same hands. The 12th and 13th I was employed taking the angles at Nazirpur trigonometrical station, and on the 15th all was ready for the trip into the hills to ascend and clear Kylas

* Official servant in semi-uniform, wearing a cross-belt and badge of his department.

peak. On the afternoon of that day—bright, sunshiny and clear, but temperature delightful at this season—we marched across the open level country towards the gorge of the Gonassery River; on nearing this the scenery became extremely pretty. The spurs from the hills run out far into the level rice grounds, and terminate in little knolls, the last of which stand quite alone, and must resemble islands in the rainy season. This appearance, and the long narrow dead-level valleys running far into the hills, gives the appearance of submergence, and is unquestionably due to a former depression of the whole mountain mass. These last low spurs and knolls are covered with rich vegetation, and often crowned with a gigantic tree of the fig family; the villages are long and straggling, buried and covered in by tall bamboo clumps, and form a marked and fine contrast with the ochre of the newly-cut rice fields. We penetrated some short distance within the gorge and stopped, when nearly dark, close to the first Gāro village on the right bank of the river, which we had crossed once below, near a deep pool with an overhanging hill above. We were now well within the hills, low spurs shutting in the view on every side; the village and our camp was on a grassy plateau that skirted this side of the river for another half mile. The villagers turned out, brought wood, and promised some fowls next morning. Jackals were very numerous, and all through the night their peculiar disagreeable bark was heard on every side. We were called by the crowing of the jungle cocks early next morning; a few fowls were brought, a very necessary supply when going upon such a trip, where it is often very difficult to get even one a day. Two of the villagers were secured as guides, and we started off at once into the bed of the Gonassery; this we followed the whole day, now wading up a long shallow reach, or crossing and recrossing it to follow the narrow level strip of ground on either side. For the greater part of the way the hills were low narrow ridges, very steep, and covered with forest and dense undergrowth, so that no path existed save the one in the river bed; during the rains, canoes (dug-outs) can be taken up as far as Kūnchūng, the only village in the valley. At points the hills terminate in a cliff of about 200 to 300 feet or so, overhanging a deep still pool, the rock completely covered with a lovely growth of various damp-loving ferns. There were few fish to be seen now, for the traces of indiscriminate poisoning were seen in every decent sized pool. At regular intervals down it, a few yards out from the bank, tripod seats are seen made of three bamboos, first driven into the sand and tied together about two feet from the surface, in which is placed a small truss of grass. On these

they sit and lay hold on the fish, as stupified by the poison they turn up on the surface near. It is a dreadfully exterminating method, and adopted all along the base of the Gāro and Khāsi Hills, when the streams fall after the rainy season, that being the time when the fish ascend from the bheels and large rivers in the plains; in these streams they are principally different species of *Barbus*, commonly known as Mahasir.

Only in one pool, near the village of Kūnchūng, did I see fish of any size, and these were evidently there on sufferance, and taken out as the people wanted them; for the body of water not being great, they could all have been poisoned in an hour.

Kūnchūng was a small place containing about five or six houses; here we changed the guides; while they were getting ready all set-to cooking their breakfasts in the bed of the river. When this great meal of a marching day was over, we went forwards up the bed of the river, which wound a good deal round the points of the lateral spurs that descend to it. About 2 miles above Kūnchūng is a brine spring resorted to by elephants, deer, &c.; it was selected at one time as the site of a "kote" (an enclosure or stockade of trees) for catching elephants, and the old stakes are still to be seen in places. The river bed now becomes much contracted and full of large masses of rock, and is no longer passable. The path soon leaves it and ascends several hundred feet, passing over a spur from the left, and descends about a mile farther on to the junction of a stream from the east, quite equal in size to the Gonassery, called the Rūngnū; here my tent was pitched on the 16th, there being only just room for it. The hills rose precipitously on every side, clothed with fine forest; there was little underwood near the streams and slopes, but among the rocks a pretty fern (*Pæcilopteris*) grew in abundance. The sori, when rubbed off on the palm of the hand and held in the sun, are seen to smoke and gradually disappear, bursting with the heat, and scattering the pollen. The natives of course say that the seeds actually do burn.

The Gonassery, flowing from north to south, the Rūngnū from due east, are bounded, the one on the west the other on the north, by the steep escarpment of granite rising quite 400 feet from the river bed. The road from the junction of the two rivers leads up the salient spur formed by the faces of the two scarps, and is very steep. Reaching the top of the ascent we found ourselves on a plateau of about one mile in breadth, extending up to the foot of another and last rise in the hills; it is readily seen that these highest masses, including Kylas, are the last remnants of the stratified rocks, now again in their normal position. These outliers give the plateau a very

irregular surface, but, overgrown with vegetation, appear level when viewed from a distance. Chikmŭng, the village we were bound for, is situated on this plateau, close in under the sandstone crags of Daogūrūng, and is inhabited by Atong Gāros. These people are in many points a distinct clan, their language differing materially from the Gāros around them. They form a small isolated colony round about Kylas, occupying some four villages; in personal appearance they differ, but wear much the same dress.

Our reception was not a promising one, and at first they scarcely took any notice of us, remaining in, and about their houses; they seemed a bad lot, expressed in Hindustani by the forcible word "mugra." They were disinclined to give any aid whatever, and would not allow that they had any head-man; and I observed rather uneasily, what is always a bad sign with these people, that their womenkind and children did not show anywhere; while at Kūnchūng they had all turned out to look at us go by.

Our guide from that place was a capital fellow, and by dint of some very loud talk shamed them into producing a fowl, as an offering to the Sahib (myself), and two other men as guides for our onward journey towards the next village, for I said nothing about Kylas then; but when this was arranged they declined stoutly to let the two coolie loads of rice be placed in the large bolbang, or the men's house; this discussion being set on foot, and the objection made, by one ill-looking individual. At one time it seemed as if we should make nothing out of them, but by patient talking the two loads of rice were deposited in the place, and with two loads more served out to all, I was enabled to start four men back to the plains for another supply.

We left immediately the matter was concluded, and halted for the morning meal, in a deep, beautiful forest glen, under the high mass east of Wanrai called Daogūrūng. The head of the Gonassery was passed in the next ravine, and we were soon after on the watershed of the Kylas ridge. A considerable number of canoes (dug-outs) are made in the forest about Chikmŭng; trees of proper size and form are selected and felled, and the canoes cut and burnt out on the spot; after which straight round poles, about as thick as the wrist, are laid on the ground, and if these be uneven, are propped up on forked supports—this entails much labour, as two or three hundred yards of rough ground are often passed over in this way—and the canoe is thus launched, in the middle of the forest, as far as the first large stream; it is then taken down from pool to pool, to the navigable part of it, and thence these

dug-outs find their way far into the plains, as indispensable to the people as a carriage or cart in the other drier parts of the country. They are generally seasoned by being kept for some time under water in some pool, and weighted down with large boulders for the purpose; they are generally about 16 feet long, and some on the Brahmaputra are of much larger size.

Passing through some old clearings covered again with young forest growth, we came on the first stream flowing northwards, and as I knew that to go farther in that direction would be leaving the peak altogether, I called a halt in the forest and conferred with our new Gāro guides as to the way to Kylas. They said they knew of no path; there was not one; to the peak they never went. I said a path must be made, and offered Rs. 10 to the first man who would show the nearest way up; but they shook their heads, and said they would not even cut a stick, suiting the action with their daos on a small twig, which was expressive. Finding our guides of no use, I sent Beni, one of my chuprasies, with our Bengali interpreter, on to Rūngshū, the next village on the north, to see what they could effect. In the mean time I took ten men, telling off the same number to the Naik; sent him to make his way up by the ravine, while I took a line straight into the forest, from a point further on along the road. After groping about the forest, and looking here and there through the trees, we tried a likely-looking spur; up, up we went, the ridge mostly clear and open, and leading in the direction I knew could only be the right one; a rocky bit followed, and then the steady ascent again, and looking through the branches of the trees, as small vistas of the distant country showed now and then, and from the height we had got, I felt convinced we had hit the western flank of the peak; and we at length landed on its rather level main ridge, along which I pushed as far as a fine open spot, on the brink of a southern cliff. This commanded a splendid view of all I wished to see—the rivers and bheels in the plains showing bright as silver in the evening light. It was with feelings of the very greatest delight and intense satisfaction that, after picking up on the plane-table all the trigonometrical stations around, I returned to camp, having put an end to all the wild superstitious reports of both plain and hill people, that Kylas was a peak not to be scaled—an absurdity it was quite impossible to talk them out of. My own men were now equally elated at our success; they had listened to many more tales about the mountain than I had. While we had been ascending Kylas, the Naik's party had been working their way up the bed of the ravine, and at last got up under the steep west side,

where they found it so precipitous they could get no farther, and so returned to the baggage and pitched camp.

The site of this was very gloomy, the high forest-trees shutting out all light, while a pair of owls made the place still more dreary by their discordant and disagreeable cries when darkness set in. On the 18th we were astir early, and ascended the hill again, leaving the tent and luggage below. I pushed on beyond the open point which we had reached on the previous evening, keeping near to the edge of the cliff, and cutting a path through the patches of a small species of bamboo, reached at last the grassy south-west angle of the Kylas plateau. The site was a splendid one, bringing in and giving me for the first time an uninterrupted view towards the west, along the high range to Túra and the lower sandstone ridges running into the plains; the broad mountain river, the Sumessary, flowing in great bends round lateral spurs, lay almost at our feet, some 3000 feet below. The forest, at this exposed south-west angle of the mountain, was, from its constant fight with the storms of the summer monsoon, of rather smaller growth, and those on the outskirts bore the marks in their gnarled forms, while some were quite dead, and a considerable open space was thus covered with grass alone. The first thing done was to fire it, and not until this was done, and the grass fell before the flames, fanned by the fresh breeze, could we well see what a magnificent prospect we were in sight of. It was the first time fire had ever invaded the sacred hill, and the tall column of smoke was seen all over the low country, and told those in the camp at Nazirpur that we had reached the summit.

After selecting the site for the trigonometrical station, and setting up the plane-table, and getting the rays to other points laid out through the forest, all the men were set hard to work felling trees and clearing the same. The headman and two others of the village of Rūngshū were brought up by my chuprasies, who had gone on there the previous day; but on being asked if they would help cut the jungle, declined, saying that if they did so, the demon of the mountain would turn them mad. They did not seem at all happy in their minds, and went off with great alacrity when told they might go. My Khāsi coolies worked hard, and a good day's work was got through. I was also enabled to take a great number of angles to natural objects for tertiary points, and to observe the vertical angles to two or three of the principal stations. My assistant, Mr. Belletty, I could see had not been idle, as the cleared summits of several hills, and the white pyramidal marks set up on them, showed.

The weather was lovely, and the heliotropes flashed brightly at the principal stations I was connecting with. As there was but little water near the summit, and that not very near, I sent all the men down to the camp at night, and had only bedding brought up for myself and servants; and we slept under a small shelter of boughs, run up between two trees just within the forest. I found it was very much warmer than down in the plains, where the cold, from the excessive damp and fog, is intense in the early morning.

On the 19th, leaving the work of clearing to progress, I started with plane-table to reach the edge of the north-west angle, or extreme northern point of the mountain, taking only Ribai and a young Burmese lad, Mounghé. The forest growth on the summit is neither high nor thick, and no underwood of any consequence.

Fresh tracks of Mithans (*Bosfrontalis*) were seen. The breadth of the plateau, which has a gentle slope to the north, is not more than one-eighth of a mile. It had evidently never been resorted to by the natives; not a mark of a dao was to be seen anywhere. The contrary is invariably the case in frequented forests, for those who have ever travelled with these hill tribes know their habit of cutting a twig now and again as they walk along, in the same way as we swish about a stick. On the edge of the steep fall I found a good spot for a "maichan," where I obtained a fine view over the Gāro Hills on the north and west, and laid the foundation of much future work on the plane-table, and selected the fine isolated mass of Mungrhi, quite within the independent Gāro country, for another trigonometrical station.

The country to the immediate north of Kylas was covered with dense dark forest; it presented a flat appearance, the rivers flowing in deeply-cut narrow valleys bounded by steep regular slopes; the sombre green of all only here and there broken by a bare bit of light-coloured cliff in the horizontal sandstone. On the 20th the felling of trees was going on. My Khāsi coolies had heavy work of it. Commencing at about 7 in the morning they worked, with an hour for a meal in the middle of the day, until quite 5, or about 10 hours. To those who cut down the greatest number of trees I gave "bakshish," the best incentive to zeal in the world; and without these excellent men the survey would have have been at a standstill altogether. 21st and 22nd still clearing the troublesome way to Tigasin, a station due east, which was closed by the forest for some 300 yards. The pyramidal mark, some 25 feet high, was erected over the station, so that should it hereafter be found to be impracticable to retain a heliotroper on the peak, it might be

used for intersection at a considerable distance during hazy weather. By covering in these marks with basket-work made of freshly-split bamboo, which shows beautifully bright and white in the sunshine, this is much assisted, while over the mark itself I set up a long cylindrical basket, like an elongated gabion, covered with white cloth; this, in thick weather, can generally be intersected by the wires of the theodolite telescope. The 22nd was very cloudy, and the observations were very wearying, the heliotropes only showing at long intervals and generally becoming obscured just at the very moment they were wanted to be seen; and Tigasin, although now open, never showed at all; and I fear the man received but few blessings, when it was evident occasionally, that with the sun full in his face, he had not got his heliotrope properly aligned. By the 23rd, being the sixth day we had seen the sun rise from Kylas, all observations to the stations cleared were completed, and we returned to the tent in the forest below. While on Kylas I obtained a very pretty form of the genus Phyllornis, which was new to me; it turned out to be *P. chlorocephalus* (Walden), a bird hitherto only known from Burmah, and now added to our Indian fauna. I also shot several specimens of the rather rare warbler *Abrornis albogularis* (Hodg.), which appeared here very numerous.

Kylas being now done with, I determined to get round by the northern side of the high main east and west range to Tigasin; we retraced our steps to Chikmŭng village, where a good hour was spent in obtaining information about the road towards the Nigam village of Nongmen, a place the position of which I was acquainted with, from my former experiences in the west Khāsi Hills, during the field season of 1866–67, and which knowledge now stood me in great stead, for they were surprised to find I had been in that quarter and knew the villages and headmen by name so well. After telling the usual quantity of preparatory lies, with reference to their utter ignorance of the place and the way to it, a very old man was at last produced, who said he had been there once in his life and *might* find the way, and we at last filed out of the place down into the valley to the east.

After crossing the head of the Rúngrhi, we had a steep ascent up the escarped slope which bounds it thence on the south bank to the junction with the Rúngnú; we emerged out upon a level flat of hard naked sandstone, only covered with scanty grass in the hollows. Crossing this we reached the head of the Mahadeo valley, which has cut back into the sandstone in high cliffs, and is a very striking physical feature of these hills, showing the way in which they have yielded to the effects

of denudation, so rapid here from the heavy rainfall. The Mahadeo valley, seen from this point, reminds one much of that of Cherra Poonjee on a small scale. It was very deep, 2600 feet, the bottom and slopes up to the base of the cliffs covered with magnificent forests. Midway between the northern cliff and the plains, the bounding cliffs, quite 1200 feet, almost meet, and thus form a grand amphitheatre.

Under a small rise on the watershed, camp was pitched early; I had here to put up a mark, and this hill I found was bare, and afforded a fine view of the country both north and south. The former side was seen to great advantage, and broad patches of ochre-coloured grass showed here and there amid the dark green woods which encircled them. Clearings were not numerous, save towards the Gāro side, where fresh patches of newly-felled forest showed that the people had been hard at work.

I obtained here, in the scrubby bamboo jungle that grew near the top of the range, two interesting birds, *Merula castanea* and *Aboricola atrogularis*. I also saw in an open grassy glade, about half a mile off, a fine herd of mithans grazing, but the lateness of the hour and the difficulty of getting to it through a broad belt of forest, rendered their position a very safe one. Beyond the hill of Balpukram, the watershed narrows considerably into a mere ridge, and the path leads on across the head of the Mahadeo valley, now on one side of it, now on the other. The ground is much broken, owing in a great measure to a north and south dislocation in the strata. A short distance further on another plateau is reached, and the road turns off to the northward and descends into the valley of the Bao Tith.

We made several ineffectual attempts to find a road leading direct along the main range to Pundengroo and Tigasin, but failed; the Gāro guides either did not know or would not show any other, save that to Nongmen, so after finishing observations at the stations on the 25th, we made for that village.

The bed of the Bao Tith is crossed at the foot of the northern slope, and was a very lovely glen, buried in magnificent forest; but after ascending the left bank, we came out on open flat glades of grass, with shallow streams flowing through them. Deer (samba) were very numerous here, but there was no time to stop and stalk them. It was dusk when we reached a small stream with good water, and as the guides could not be depended on as to the distance of the village, I pitched camp by the edge of it. Night very cold, with a white frost, the site being low and damp.

Nongmen was still, we found next day, two miles farther up

on the other side of a considerable stream, the Mairam, which, rising near this, flows due west, taking all the northern drainage of the Kylas ridge, and then uniting with the Sumessary. We got into Nongmen early, and I found there some Langams I had previously had with me in 1867. After all the stories told by the Gāros of Chikmŭng as to their ignorance of Nongmen and its inhabitants, it was most amusing to witness the guides salute them as old acquaintances; nor did they seem in the least ashamed of their attempt to prevent our march in this direction when reminded of it. Nongmen is a small place of two separate hamlets, each of about ten houses.

We quickly changed the guides and went on towards the base of the main ranges at Pundengroo, the road running the greater part of the way up to the Bao Tith over open narrow flats of grass lately burnt. The Bao Tith flowed in a deep ravine, with precipitous sides, well wooded wherever the trees could get a holding, and ferns growing in great luxuriance. The bed was full of coal in pieces of considerable size, but none occurred *in situ*. While breakfast was being prepared I collected a quantity and made a fine fire, which burnt fairly; the Langams were quite surprised to see that it was combustible.

The Khāsi coolies of course knew of this quality, coal having been quarried and used so long at Cherra Poonjee. After climbing the steep slope of the right bank, we emerged into the open clearing called Panjali. This plateau had originally been covered with forest, but was now under rice cultivation, and the crop just cleared off the ground. Panjali was merely a clearing with two or three huts, occupied on and off by the people when the crops required weeding, &c. The nummulitic limestone was noticed here, occurring in small outliers on the clearing; beyond, on entering the forest, and the path taking the course of a stream, it was largely developed. At the junction of this stream with another from the south, I ordered the tent to be pitched, as I found the road for Tigasin and that to the plains here parted; and taking the theodolite and plane-table and a few men, I went off at once to the former station, to take one or two angles that remained to be observed.

The trigonometrical station of Tigasin was selected by me on my previous visit to this side in 1867. It is situated on the edge of the steep northern slope of the cretaceous sandstone ridge. This has a very gentle fall to the south, and thus I found it impossible, without the expenditure of an enormous sum of money, to clear the forest that intercepted the rays to Kylas and Marangthang. I therefore selected a stout tree on the highest part of the hill, and this, cut off at about 15 feet from the ground, formed the stand for the theodolite; around

this tree, and clear of it, I erected a scaffolding and platform, so that one could walk round (lay the telescope and observe, and read off the angles) without shaking the instrument. By this means it was only necessary to fell the nearest trees, and by sending men up into the tops of those beyond to lop off the boughs, the rays were very soon opened up. The lopping off of the crowns of trees was soon effected, as they fall by their own weight after a very few cuts with the hatchet. I have mentioned the word "maichan," and I may here give some idea of what it is, because a great deal of the topography of this part of the hills, was laid on my plane-table from these "maichans." It is a platform built in the crown of the highest tree on a commanding hill-top. These stations of observation were sometimes as much as 120 feet above the ground; the tree was ascended by a ladder formed of straight saplings, lashed on to the trunk with cane, spars were laid across the forks in the uppermost branches in the crown of the tree, and again laid with bamboo firmly lashed down; this formed a good platform large enough for the surveyor to walk round, his plane-table standing in the centre. Of course, with the slighest breeze, the rolling was considerable; but it was quite possible to cut in one's position, and get rays, and sketch in the country, from such a vantage spot.

The view presented, when on a level with the tops of the forest that stretched sometimes for miles, was very striking, particularly the effect produced on first emerging out of the forest below, where the range of view is confined to a few yards only. It is the most rapid and effectual method of mapping a forest-clad country; clearing such hills to the ground takes many days of hard labour, and can only be resorted to for trigonometrical work. A "maichan" can be built in about six hours by men accustomed to such work as the cutting and splitting of cane and bamboo; and without either one or the other of these useful plants it would be difficult to adopt the method.

Tigasin was much farther than I had imagined, so that after finishing the observations it was late, and before we had got far on our way back, it became very difficult to follow the narrow track. Torches of dry bamboo were made up, and we crept along slowly and down the last rather bad descent into the bed of the Daokikha. It is very disagreeable, fatiguing work, at the end of a long day on foot, thus stumbling over blocks of stone and fallen logs by the uncertain light thrown by a torch: nothing brings out the character sooner, especially a bad one. We waded up the last portion of the way in the bed of the Daokikha, and I was heartily glad when the light of the camp fires

glimmered through the trees, casting their reflections on the water ahead. It was past 9 o'clock when we got in; we had been afoot since daylight, and had got over some 18 miles, and I was not sorry that I had done with Tigasin for ever. Many of my men had then to prepare and cook their own dinners, and had not laid down by 12 o'clock. The gloom of these forest camps was quite overpowering; the want of light, the dark sombre green of the foliage, the stillness of the air, and the rank damp smell of decaying vegetation, all intensified the feeling, the only sound that broke the stillness being the murmur of the stream close by and the croaking of frogs. Yet they are not without great beauty; the jagged, denuded surfaces of the grey limestones are set off by the elegant ferns and palms that form the underwood, and by the moss-grown trunks and roots of the trees.

We were now close in under the high scarp of Pundengroo, which rose boldly on the west, the long wall of grey sandstone cliff showing well against the forest at its base, and that which grew up to the edge of its plateau. I had to visit this hill next day, so we took the road to the plains N'a Júgni. Path ascended a short distance over a low hill, where we left the limestone rocks, and descending again into a higher part of the Um Túngkút. Here I noticed coal in fine thick beds, and where the strata at the base of the cliff are very highly inclined. The ascent to Pundengroo is upon the main watershed where it is thrown off from the cliff. This spur, as one nears it, is extremely narrow, and a part, owing to a landslip, is cut right across; it had, however, been bridged with bamboos by the neighbouring villagers, who go up into the forest above for canes; but for this, we should have had great difficulty in getting up. The platform of Pundengroo forms one of the strongest natural positions it is possible to conceive; immediately above the bridge, the path up the scarped side begins, and is very stiff for some 600 feet. I found that the station cleared by Lieutenant Beavan was a very commanding one for plane-tabling, but the tree selected for the theodolite was too high to admit of being observed from, and had in consequence much motion. I had therefore to give up the idea of making it a trigonometrical station, and returned to the valley below, continuing the march over into the valley of the Rongsiang, and encamping at the first water found in the bed of the Sū Hileng tributary. This stream issued from out the limestone, which we soon came upon after crossing the watershed. This formation continued a long way down. The bed of the Rongsiang is broad, and for the greater part of the distance dry, only now and then the water shows itself. The remainder

of the channel, which is seldom less than 50 yards, is exceedingly rough and eaten into curious shaped hollows and holes; during the rains these portions are of course boiling rapids.

The whole valley is forest-clad, and some fine india-rubber trees are to be seen. Just before the junction of the Sen River, the fall of the Rongsiang is considerable, at the same angle as the dip of the limestones, which turn over and disappear far below the upper and newer sandstone series. Close to the junction, the whole body of the water of the Rongsiang issues from a cave in the limestone of the right bank, and thence into a deep pool under the cliff of high-dipping thick-bedded sandstone rock. This pool is noted for the very large number of fish yearly taken out of it by poisoning the water. The fishing was at this time over, but the many old camp fires about, and the remains of temporary sheds and drying frames of bamboo, showed that the fishing employed a large number of people during the month of November. From this pool the river is navigable the whole way to the plains. Cliffs of sandstone occur on the left or western bank, but the spurs on the east are low as they approach it; the scenery is very striking, and it is novel to be thus able to travel by canoe down so small a stream with high hills rising on either hand—a proof of the recent depression the whole range has undergone, and the subsequent silting in the plain and troughs of the lateral valleys.

At the Habiang Gāro village of Mekura, I left the dug-out, and, while waiting for the rest of my men, went in and sat down with the villagers, who soon assembled round me. I made a sketch of an old lady with heavy-laden ears of brass rings, and her likeness being a fair one, I made an impression on them, and had numerous offers from other lookers-on to take their likenesses. As to the old lady, she was so pleased at the notice bestowed upon her, that she said when I rose to depart, on my coolies coming into the place, "What, going so soon? why don't you stay? it is getting late; we can find you a hut." I, however, refused the good lady's offer, and marched on to the open plains, and skirting the base of the hills, encamped in the Bengali village of Pang-gam, lying at the base of spurs thrown off from Marangthang peak (1389 feet), the next station to be visited.

I was on its summit by 8 o'clock the next morning, the 30th, and commenced observing the angles. The haze, however, became so dense, that at last it was very difficult to see the points. Kylas, my most distant ray, could not be seen with the naked eye, and the heliotrope only appeared like a very minute red star in the field of the telescope.

To make matters worse, I was driven nearly distracted by the

near its embouchment into the plains, which landed us under the first terminal spur bounding the river on the right bank. The breadth of the river is here 350 yards, about knee-deep, and flowing with an easy current; but both above and below the ford the depth is greater, and under the banks it is considerable. Fish seemed pretty abundant. The hills on either side for some distance up are low, the highest spur being that thrown off Joksangram, and terminate precipitously just within the gorge. Up to Mutchi Ghat, the Sumessary has a direct course, but it then takes several great bends round a spur from the north-west and south-east; the character of these outer spurs is that of isolated masses rising about 500 to 800 feet above the level of the streams, the connecting ridges being very much lower: the saddles or lower parts, only 50, 100, and 200 feet. The ground, overgrown with dense jungle, is therefore most intricate and difficult to map out. At intervals up the river we passed weirs of stakes and matting, carried quite across the river, with passages left here and there for the fish to pass; these passages were guarded by scoop-nets worked by hand, the fisherman sitting and patiently waiting for the fish as they came up, and raising the lever of his net from time to time; in others basket-work traps are set.

I noticed that the platforms on which the fishermen sit are screened on the lower side, or that from which the fish working up stream would arrive, by matting 4 feet high. The way leads up the bed of the river, as often in the water as over the sandy margin, crossing and recrossing from bank to bank. We stopped about 12 o'clock, to breakfast, at a deep pool called Mutchi Ghat, at the base of a high cliff; the river had here to be crossed, and while breakfast was being cooked, our traps and men were ferried over and the ponies swam across. Some fishermen were here busy at work; in the deep water at the base of the cliffs a series of deep parallel nets were fixed, three to four yards apart; the floats of hollow bamboo, lying flat on the surface, gave notice directly a fish was entangled, and then a man put off in a canoe and took it out; thus we saw several fine specimens caught, and they had made a good bag. The police and men of the survey establishment walked off with fine dinners, Williamson giving the fishermen a present for the whole lot, while we enjoyed a bit of fish broiled for our own breakfast.

At Mutchi Ghat we left the river for a while, ascending and crossing the north-west and south-east spur, striking it again about two miles further up. Scenery very pretty, with striking views of Kylas and the Tura ranges. About 4 o'clock we reached a fine rapid, below Rywuk: this looked so tempting, that

I put up my rod and whipped it for about an hour, taking out about half a dozen nice "mahasir," running from 3 to 5 pounds. The river was low, but at proper seasons the fishing must be splendid. Above this rapid the river assumes a different character, and is for two miles deep and still. The Gāro village of Rywuk is situated about midway, and this short distance we were taken up in a canoe, and it was quite dusk when we reached our tent, which was already pitched on the sands of the left bank. On the 15th a halt was made, for I had to go up to observe at Agal, a point selected by Mr. Belletty. A place was cleared for a depôt camp away out of the bed of the river, among the limestone rocks of the right bank, and a new disposition had to be made. We only took one tent, a small Pāl, and all unnecessary baggage was left behind; thus several coolie loads were saved, and the men carried rice and provisions instead, for we knew that little or nothing was to be obtained when once the Túra range was crossed, until we got into the Gwalpara district of Assam.

The next rapid above Rywuk has a considerable fall, but not sufficient to prevent the passage of canoes (dug-outs); these being dragged up over the boulders close into the bank, or up channels formed by piling boulders taken out of it on either side, and thus allowing the canoe to partially float. Kylas, and the Túra range, here towers above the valley, and forms a splendid background. Got off pretty early for Agal station, the highest, most open point on the sandstone ridge to the west, whence a very fine prospect is to be obtained over the maze of low hills that stretch towards the plains. The spur is thrown off from the high point of Dorengo, and here terminates at the angle formed by the Lookhaee nulla and the Sumessary. On the opposite and eastern side of the valley, at nearly the same level, two broad plateau-topped spurs marked the extension of the horizontal sand-stone strata we were standing on; and between the base of the steep slopes of these spurs and the river occurred a considerable belt of level ground with high scrub and grass. These small southern plateaus were isolated from the next sudden rise of 1500 feet in the hills, forming the main high plateau, carrying the elevated mass of stratified rock, Kylas.

Looking westward, a succession of spurs, one beyond the other, given off from the Túra range, met the eye, the strata turning up against it. On several hill-tops, the white pyramidal marks showed the steady advance of the trigonometrical stations, and I was glad to see the trees thinning away on the top of Mimanram, a high point on the main range, which has since been proved to be the highest in the Gāro Hills, viz.

3922 feet. The credit of clearing this is due to Mr. Belletty. Very little cultivation met the eye; some large clearings of forest occurred here and there on the slopes from the Túra range; all the hills southward were covered with jungle, and a few clearings of bamboo marked the whereabouts of man, but no villages were to be made out. Looking up the river north-east, its course was visible far above Rywuk, and both that village and Sejoo were conspicuous on the banks, from the long pented roofs of the houses; such houses are not to be seen in the outer villages. I got a good round of angles in a very short time at Agal. The day was splendid and clear, and the heliotropes flashed brightly. Returning to Rywuk our plans were matured, and we decided to cross the range to Baduri, visiting the new station of Dorengo (also cleared and selected by Mr. Belletty) on our way. The road strikes the ridge of the Agal spur; and on the ascent, Williamson pointed out the site of the first stand made by the Gāros, on an expedition he had accompanied to burn Baduri, some seven years previous, in 1863. The spot was eminently well adapted for a stand; a rugged band of the limestone rocks here crossed the spur, and the only path led through an exceedingly narrow fissure in the rock; the Gāros, however, made a feeble resistance, although the spot was stockaded, and after throwing a few spears, bolted. They again opposed the expeditionary party, on the very steep slope under Dorengo, by rolling large stones down it; but only two or three men and one officer were thus bruised, and they were driven back again. Before we ascended the hill we had breakfast in the last ravine-bed where water is found, none being procurable on the immediate top. On reaching the crest of the range, the baggage was all sent on to an open spot upon the ridge, a short distance further, and near to which on the west side exists a small spring of water. Williamson and myself proceeded to the trigonometrical station of Dorengo, for I had to observe the angles there to Kylas, Wajongkorong, Joksangram, Mimanram, &c. The day was lovely, heliotropes all showing, so this work was soon got over, with Williamson's aid, recording. I worked in my plane-table a reconnaissance of the country, and finished by taking a general sketch of Kylas and the hills to the east.

It was delightfully cool and pleasant at this altitude now, after coming up from the level of the Sumessary valley and Durgapur. On reaching camp, worked until it got dark, inking in the pencil detail on the plane-table, and skinning some birds my collector had brought in. We continued our march the next day to Baduri, descending into one rather deep valley; forest scenery all the way, with some striking views of

Kylas. The charred piles of old Baduri were to be seen still, standing up out of a new growth of rank vegetation. The new village had been erected a few yards off. The headman of the place met us on the road, about a half a mile from it, and no doubt on recognising Williamson remembered the past, and the treatment they had then received; but the fellow, a fine-looking Gāro, was very civil, and the punishment had certainly done no harm.

In the evening, we walked some distance to the westward, through the newly-cleared jooms, where I managed to fix my position and cut in a number of hills to the northward, on rays laid down from Kylas.

The next day's march carried us to Lenksram, and we wound up the day by a rather stiff ascent to the top of a fine cleared hill, whence I could see some fixed points and thus connect my position. The village was situated just above our camp, and is a small outlying hamlet of Darang-Giri.

We had now worked round to the back of the Túra range; a principal spur, steep on the western face, was here thrown off to the northward; three hills lying upon it marking its very direct direction N.N.E. up to the Sumessary; while another hill and straight line of bluff, on the other and northern bank, marked the continuation of this lateral axis of elevation on that side.

This part of the march lay in the bed of the above small lateral stream, which was very narrow and full of large round blocks, and its steep sides clothed with luxuriant ferns. The Sumessary at this higher part of its course, 25 miles from where we had left it, was a large river nearly waist-deep, in fact with a far greater body of water than is seen at Rywuk, where a large amount no doubt disappears into the many underground channels in the nummulitic limestone. The pools were very deep and very beautiful; in some were large masses of rock, rising out of the water. The stream looked so promising for fishing, that while the loads were passing over on the bamboo raft, and breakfast was preparing, I set up my rod, but without success, although I rose two fine fish.

We pushed on well this day, the 19th, and by sunset got into Dāwā, situated close under the high hill of Mungrhi, which it was desirable to clear for a trigonometrical station.

20th February.—After writing and sending off letters, we made an ascent of Mungrhi, passing up through the fine forest on the western slope. Some 50 men (coolies) were available. I selected the highest and western end of the hill and commenced felling. After we had been there a short time, Judabir, a heliotroper, came in from Shemshang Giri, with 20 men from that village; these were a great addition, and a large

amount of clearing was effected; fine views were presented as the great trees came down, but I could not commence any work, which had to be deferred until the return from another hill I had selected 9 miles to the north-west; but it was very doubtful, situated as it was in the midst of the independent villages, whether we could get there. On the morning of the 21st, just as we had started, in came a small army of men from Shemshang Giri and Negmundal. The Mundal or headman of the former village was among them, and we took him on with us; sending the wood-cutters on with Judabir to the hill-top. Setting aside the importance of getting the hill cleared so soon, it was most satisfactory and encouraging to see that so many of these people will collect and give aid so willingly and readily at the request of our survey chuprasies. It showed that the latter were acting with good address, and that a good feeling existed among the villagers, a people considered so inimical. We proceeded from Dāwā, along the southern face of a ridge running W.N.W., the slopes of which had been a good deal cleared, and large patches of bamboo were then going down before the axe, and terrible stuff it is to pass through when lying on the ground. The path was very uneven, over the many small narrow spurs thrown off to the south. These spread out into a low flat forest-covered country, on the Sumessary; and this expanded above Shemshang Giri into a wide plain backed by the Túra range. This expanse of open country, with a mean elevation of 1200 feet, is an interesting physical feature, and does not find a counterpart in the adjacent hill country. Thanks to the numerous clearings, I obtained a great number of plane-table fixings, and did a good day's work. In the evening, on a hill near Norek, I put up the theodolite, and took angles to Mungrhi, the flag of which was up, and peak B (Mimanram), but it was so hazy, few natural objects could be intersected. Camp was formed on the bank of the stream, flowing through the village of Norek, a largish village of 25 houses.

22nd February.—Off early at 6 o'clock back to the station of the previous evening, but could do nothing owing to the haze, and returned very disappointed. The headman of this place had to pay up his arrears of revenue, he was very reluctant over it, made feeble excuses, just short of refusal, and after causing great delay, complied. Williamson (who had shown most praiseworthy patience with the fellow, who was negatively impertinent, and whom a good smack in the face would have done much good, and brought him to his senses) then asked him to accompany us and show the way on to the next village. The fellow said he must go and get some rice for the journey,

and went off to his house across the stream, to comply as we supposed, but immediately bolted; this was the sign to the whole village, who followed his example in a general stampede into the dense jungle around, with the exception of one man who happened at the time to be standing amongst our retainers, and he was instantly secured, to point out the road to Rangap Giri.

Now was shown the first signs of discontent and unwillingness on the part of the mundals of the different villages, who up to the previous day had been most communicative. They began to say that they did not know the road, they could not go on; and while Williamson and I trudged on in front, they lagged behind the laden Khāsis, and we had at last to stop to let them come up. A long talk ensued, every kind of excuse was made, defeated by Williamson's arguments; they then stated that thei ndependent Gāros were up, and even tried to frighten us by suddenly remembering that small-pox was raging in the next villages. While this waste of words was going on, the only guide, the man of Norek, watching his opportunity, dashed off into the scrubby jungle, and was immediately out of view. This was rather awkward, for no one knew the way; the path we were on being a mere track, which might only lead to some distant and freshly-cleared ground.

It being past 10 o'clock, we made the usual halt for breakfast; Williamson and I, discussing the turn of events, during the meal, determined to push on and find the way in the best manner we could. Such delays were very serious, and were greatly against our doing much exploration; our supplies of food could only last a certain number of days, and our base was daily farther off.

Very fortunately, when the meal was over, and loads repacked, two men came along the road from the side of Rangap; they did not bolt as we expected, but turned back with us, showing the way as far as a hill above the village, on to which I went to observe from. The laden coolies rested below. Huri Sing, a head constable, who spoke Gāro well, was sent with a villager into Rangap, to see if he could get a guide or two, to show the way to the hill Shokadŭm: he returned, saying he could only see 7 or 8 men in the place, all the women and children having left it.

On rejoining the coolies at the foot of the hill, the mundals actually proposed that we should return to Norek, although they in the first instance had recommended the route viâ Rangap, declaring the independent men would oppose our advance. Williamson told them that if they would not show the southern road to Shemshang Giri we would find it ourselves, and failing, could find our way (the one we had come by)

ourselves without their aid, and that therefore they might go off at once, so disgusted was he with their conduct. This shamed most of them, and the Bong-kong Giri and Dāwā mundals went down the hill-side towards Rangap Giri, and we followed behind them. The mundal of Shemshang, who had been the worst and greatest liar of the lot, hung back to the last.

About half-way down the descent into the little valley we met 3 or 4 men with spears, and they turned back with us. Arriving in view of the open space near the village, a small stream separating us, we found all the men were out, armed with spears and swords to the number of about 40, who called out and made signs for us to stop. We walked on up to the stream, when the headman, to our surprise, came forward with 3 rupees in his hand to present as a nuzzurana, and his men I observed all laid down their spears on the ground for a second or two, then raised them and came crowding round us as soon as Williamson had accepted the present.

On being told that we wanted the road shown to the next village, they waved their swords and shouted; eight of the younger men ran to the front, and started on before us into the jungle path. The whole matter now seemed simple enough; they were very naturally suspicious of *our* movements and visit, and believed *we* were quite ready to commit mischief, as all armed parties visiting them from afar would do, according to their past experience; a return on our part they would have construed into fear, and could not be thought of. Such meetings are always very ticklish affairs, and an *émeute* may occur in a moment, and like a spark swell into great proportions; while every village around would be up in a few hours, and easily cut off and render the retirement of a small party very hazardous work, especially when night set in.

We reached the second village situated on the Rangap river, from which these hamlets take their name, and here the brutes of mundals from the outer villages again gave trouble, and wanted to push on out of the place. Their apparent anxiety and forebodings were of course very unpleasant, and had a tendency to frighten the porters, on whom we depended for everything. We decided that whatever designs the independent Gāros might have, it was the best course to remain in the village than go on late and pitch in the open. So we chose a spot in the village street, close to the large house of the men, or bolbang, and thus ended my first introduction to an independent Gāro village. The night passed off perfectly quiet, the people not making themselves even troublesome by curiosity. We took all precautions against any surprise, and kept half the guard with the arms, while the other moiety

cooked by the river-side below. We were off pretty early the next morning, and at this hour the cold was very great, from the low situation of the village in the damp, wooded ravine. Williamson presented the old lukmah with a pugri and a cloth; and the dirty old ruffian looked quite respectable after they were put on. Some of the men then wanted to see the breech-loaders fired, and Williamson smashed a bottle and fired at a tree for their amusement, each successful shot being received with a yell of delight. We theu marched off for Bong-kong Giri, whose lukmah, as well as Rangap, desired to pay a nuzzurana; these village communities are closely connected, and they look to each other for example; and thus Rangap having owned allegiance, Bong-kong and Rong-reng followed suit. Here two or three of the obstructive lukmahs (headmen) were sent to the right about, and told to go to their homes, which proved the greatest blessing. The Baduri man, however, begged to be taken on, and seemed to be ashamed of the part he had been lately playing. With the lukmah of Negmundal all was plain sailing, and but little prevarication went on.

In Bong-kong Giri I saw the first Gāro wearing a kind of crown ornamented with tinsel, the honourable distinction of a man who has taken a life in a fight or otherwise; one only finds them worn in the independent villages.

From Bong-kong Giri we marched through a very level tract of grass and forest trees, to the banks of the Sumessary, or Shemshang, as it is called in this upper part of its course. Some very fine "sal" timber is to be seen here, and it is the principal forest tree.

The Shemshang is at this place a quiet stream about 30 yards wide and knee-deep, with low banks of sandstone. The forest is thinner in parts here, with open glades of high grass.

After fording the river, in which we had a delicious bathe before breakfast, we passed over the flat ground on the south, which soon gradually ascended and crossed a low spur, and our path dropped into the gorge of the Chibok, up which a short distance is the village of Negmundal, two miles distant on the right bank and about 150 feet above the river; this had now very little water, but its broad, bouldery bed showed that it was one of the large feeders of the Shemshang that rise in the main Túra range.

The spurs on either side were here steep, and covered with primeval forest, extending thence to the summit of the range, six miles direct distance to the south. The day was very hot, and we were glad to sit awhile in one of the larger houses of the place. Williamson's turn for work had now arrived, and

he was busily taking down the deposition of the headman and others, relative to the Raja of Shūshang's people, who has been gradually extending his influence farther and farther into the hills, and requiring annual payment from these Gāros, varying in amount and kind; failing which, threats of punishment had been undoubtedly held out, such as the *assessment* of their cultivated lands, and persecution in the markets of the plains. The lukmah here agreed to take us on to Surramphang Hath, a place where a large annual market is held, but only attended by Gāros. No Bengalis from the plains are ever allowed to attend it, either as buyers or sellers; produce and commodities from the plains are brought up by the outer Gāros; cotton being exchanged on the part of the interior villagers. Among other things taken by the latter are large numbers of dogs, which are fattened and eaten. We saw a great number of these at Rywuk when on our return, the people were then getting the supply ready. Colonel Houghton, the Commissioner, had been very desirous that this market-place should be discovered and its position fixed, and it was a most satisfactory victory over the scruples of these Gāros, and the lying stories they had told of its position, with the difficulties that would attend our getting there; this victory was solely gained at the expense of long and continued talking. Leaving the bed of the Chibok, we followed a low ridge overlooking the flat ground in the Shemshang, passing through large clearings of "sal" forest where splendid timber had been felled and burnt; at three miles we reached the river, where, on the opposite high bank, was situated the village of Rong-reng Giri, the nearest to the hath, on the east. The river was here still navigable for small canoes during the rains, but at this season the rapids, which occur at intervals between the large deep pools, are shallow, and it would be too laborious work to drag them over such places.

Fording the river here, we pitched the tent in the village; raised clear above the forest on the high bank, the peaks on the Túra range could be seen, and enabled me to cut in its position with accuracy.

At 7 o'clock the next morning, the 24th, we left for the hath, leaving all the coolies in the village, and four constables in charge. The largest and most powerful independent village, viz. Dilmagiri, is close to Surramphang, and it was very necessary to be guarded, in how we entered it; it can never be contemplated what wild tribes like these may do to oppose a party. Our total number of police, armed with muskets, was only 17, two head constables and an inspector, leaving very little margin as guard in camp for a "dour" of this kind, and the

worst to fear is a panic among the porters. Recrossing the river we marched through the forest on the south bank of the Shemshang in a westerly direction, taking a short detour round by a mere forest track. The forest was here principally of "sal," with scarcely any underwood; grass growing about two feet high. An hour and a quarter's walking brought us at last to Surramphang, close to the right bank of the Shemshang.

There was nothing very remarkable about the place; no market had been held, it was evident, for a long time, and but for the few low huts, no one would have supposed it to be a market-place. The Shemshang murmured over its bouldery bed, and the forest trees towering up around shut out the view to the southward. On the opposite bank was Samandal, and one or two men were seen, who shouting out a warning, vanished.

The place is named from a tree called the Surram, compounded with the preposition "phang," below. After I had marked off our route by bearing and distance on the plane-table, and got the bearing from the guides, of several independent villages lying near, we retraced our steps to Rong-reng Giri, our party not being strong enough to beard the rise of the numerous independent villages we had now got among, and of whom nothing was known. Fixing the position of the hath was more than we had ever expected to do.

The Government policy is to keep quiet with these people, and not to bring on a row if it can be avoided; to this policy Williamson has to act up, much against his own wish and feelings, for sooner or later the pressure has to be brought to bear, owing to some unprovoked murder case, or attack on some neighbouring village by one of its independent neighbours.

On returning to Rong-reng Giri, we had a fine swim in the pool, then breakfasted, and started back eastward, following the regular hath road the whole day—sal forests, more or less open, with glades of grass—and crossing a few bouldery ravine beds from the Túra hills.

At Shemshang the river is very sluggish, with bouldery bottom, and numerous "dug-outs" were seen, which are much used during the rains. The place consists of three separate hamlets on the right bank, the middle one situated just east of the junction of the Chibok. Close beyond this we had to cross the river to the other bank to avoid the rather long southerly bend of the river. At the crossing, the river was deep, and men and baggage had to be ferried over in canoes. The banks were here of sandstone, about 30 feet to 50 feet high. Pea-fowl were very plentiful, and several were bagged. In going after one I had a very narrow escape from being spiked in a pitfall made

for deer, in a run leading to a patch of cultivation; very fortunately I slipped in near the edge, and fell between the side and the sharpened bamboo stakes. These pitfalls are very dangerous, and the following season a Gāro woman met her death from one, under the following unfortunate circumstances: The survey party coming suddenly into a patch of cultivation, the Gāros weeding it, bolted, as they usually do; this woman, in her fright taking the line of the pitfall, received a spike right through the femoral artery of the leg, and bled to death in a few minutes.

25th February.—Before leaving Shemshang, I had to pay up the wood-cutters who had cleared the hill of Mungrhi; the payments I always made with my own hand to the men themselves, never allowing the money to pass through the hands of any native of the establishment—a rule that should always be followed with a new people such as the Gāros. Getting a shot every now and then at pea-fowl, we got back into Dāwā about 11 o'clock, meeting the men with letters half-way. After breakfasting, I went on up to the station at Mungrhi to observe the angles; the day was fortunately clear, and this was very soon got over.

26th February.—Marched at 8 o'clock over Mungrhi, and then along its northern spur to Doboo, through virgin forest. Crossed the Lenkra stream close to the village; this receives a number of small rivulets taking their rise some six miles north. We followed the Lenkra for about 3 miles, and then turned up into the lately cleared ridges, between that and the Rŭngŭt, another tributary of the Sumessary. Several low conical hills were seen from here to the northward, and marked the main watershed of the hills; while the summits of others, far down on the north base of the range, were also visible. In this respect the country here much resembled that to the north of Jaintia, but the vegetation is very different here; sal replaces the oak and fir of the eastern hills. The low, narrow ridges we were on ramified in every direction, trending to the south, having steep sides and sluggish boggy watercourses between them, where bamboo grew in great luxuriance, mixed with tree growth. The larger streams, like the Rŭngŭt, flow in broad flat valleys, and on the slopes on either side, the sal forest comes in, extending here and there into the open grassy belt. Looking towards the east or Khāsi side, the line of horizon was very flat, a bluff marking the fall into the Sumessary drainage.

On the 27th we got into the valley of the Rŭngŭt, and passed through the two hamlets of Daroo Giri, following the stream for 5 miles, our path often through high grass, which must be

a swamp in the rainy season. Then reaching another small collection of houses, forming part of Daroo Giri, we left the Rŭngŭt on our left, and ascended the low ridge, where I obtained a fine point of view and survey station on one of the low conical points we had seen the previous evening. These higher masses are bosses of gneiss, harder than the rest of the circumjacent rock, and have thus withstood the effects of denudation, like the fine mass of Kollong in the North Khāsi Hills. The ridges we were now on had a strike E.N.E. and fell abruptly on the north, throwing off innumerable parallel narrow spurs to the south only. Immediately below, on the north, was a flat grassy expanse, triangular in shape, and in which I found was both the source of the Rŭngŭt and the Chichira, a large stream flowing into the Gwalpara district and the Brahmaputra. This flat valley was bounded on the west by a steep hill of gneiss, and this continuing W.S.W. was connected with Shokadum, and marked the western extension of the main watershed; the continuity of which eastward, as a mountain feature, is here broken.

We encamped in the large village of Rong-reng. The people were civil. Jungle fowl were numerous around the village. The next day we followed down the valley of the Chichira; fine sal timber seen here, hills rising abruptly from the valley on either hand. Nearing Gabul, about five miles down, we left the river, crossed a low spur, and pitched tent in that village. Williamson and I, after some breakfast, marched on to Mejolgiri,* a village some thirteen miles from the plains on the north, in order that we might lay down the road the whole way across the hills.

From the top of the ridge we obtained a fine view to the northward and to a great distance westward, for this point lies upon the edge of the northern slope, and overlooks the valley of the Brahmaputra, and the valleys below us on the north could be followed from their source into the plain. The little and new swift (*Cypselus infumatus*, Sclater; *tectorum* of Jerdon) was here extremely numerous, and exceedingly fearless; their nests were built in the palm thatch of the houses, about the eaves and on the gable ends, no higher than the head of a person sitting about the entrance. I took them off the nest with my hand, and kept a couple as specimens, which I could see the Gāros did not quite like. By the time we got back to our tent in the village of Gabul, we had done a good 18 miles.

1st March.—The supplies not having arrived from Gwalpara,

* Mejolgiri is a large village, and the residence of a mundal, who was rather astonished to see us arrive.

a halt was made; but at two o'clock I started down the little valley in which Gabul is situated, and ascended the hill on the east, to fix its position and cut in some of the points around. I was rewarded by another fine view of the surrounding hills.

On returning to camp, I found our fresh supplies had come in. Williamson, who had been ailing the last day or two, was here rather unwell, and I was uneasy lest he should get fever, which takes such a serious form in these jungles.

All being ready for our return journey to Shūshang, we got off about 8 A.M. on the 2nd March. Our road lay for a short distance up the Chichira, when we turned off to the east, through some rather dense jungle, to the village of Dambo, situated on a good-sized stream from the north-west, called the Mandu, and which is the principal feeder of the Chichira. While Williamson remained in the village of Dambo, taking depositions, and receiving the annual payments, &c., I crossed the river and ascended the steep scarp opposite; and to the south-east, in a clearing on the top, I got a fine and extensive view up the Mandu valley, bounded on both sides with very steep forest-clad slopes. On returning to the village we followed the northern base of the porphyritic granite ridge, and by 5 P.M. reached the village of Rong-reng, which we had previously encamped in. From here we determined to follow a new line of country, and visit and take over the independent village of Nongsram, where a market is occasionally held. The road out of Rong-reng lay due south, up a ravine draining to the north, jungle much mixed with bamboos, and showing in places that it had been cleared many years back; some of it was now undergoing a second cutting. Crossed the main watershed by a low gully, and the path then lay down a wooded ravine, thence into an open valley of grass interspersed with sal.

Path excellent all the way to Nongsram, a finely built Gāro village, situated at the junction of the small stream, called the Rongra, that we had been following down, and the larger, the Rungdi, from the north-west. We had heard that Nongsram, hitherto independent, would, if visited by the Deputy Commissioner of the Gāro Hills, own allegiance like all those in their neighbourhood.

The headman in due time produced his nuzir, his deposition about different matters, and a certain murder case was taken down; and after breakfasting, we proceeded due south down a small valley, the Rongdu, running parallel to and east of the Rungdi, about half-way to Swang-giri; we ascended by some very steep paths into the large clearing, and got in a good deal of country.

Swang-giri turned out to be a very large village, paying revenue to the "seem" or chief of Nongstoin. It is situated close above the junction of a large stream from the north-east, which rises in the Khāsi country, and is called the Dat river. Steep bluffs rise very suddenly here on the east, and tower above the village. Crossing this, the path became bad, and after passing some old clearing, we descended, following the bouldery beds of watercourses until we got into a more open valley; it was dusk the latter part of our journey, and the deep ravines, shaded by high trees and ferns, soon became very dark, so that some of the things got into Sudu-giri very late. This was a very small place of some half-dozen houses, another small part lying about a mile off to the north-east.

We had now got to the confines of a thoroughly forest country. On all sides, dense high forest that had never been touched by axe met the view. Through this we marched the whole of the next day, the 4th of March, crossing one high flat plateau descending into the level of the Rengchi, flowing south-west to join the Sumessary. Our path ran with the course, oftener in it than out of it; the fall very gradual, long still shallow reaches, with sandy bottoms, separated by gravelly bouldery falls. Just before reaching the junction with the Sumessary, the roar of whose waters we could hear, we struck up over a ridge, and descended again upon that river at a place called Kŭtchú (now deserted). The scenery was here very grand, and during the height of the rains must be truly so; the whole body of the water is thrown over a steep and sudden ridge of gneiss, which strikes east and west across the bed, into a large deep pool below. At this time of the year, the reduced amount of water finds its way through a deep cut or groove by several small falls on the right bank. The bed of the Shemshang in this gorge is choked with enormous sub-angular blocks of gneiss and sandstone; the former from the right or west, the latter from the left, or east, bank. In this deep north and south gorge, it makes its great fall to the very low level at Sèju, some 700 or 800 feet, in 10 miles. We here left the river and ascended the hill-side, and encamped in the jungle close to a small ravine with water, on a plateau to the north of the Rong-kai valley. Owing to the forest and the low grounds we had passed through, surveying was hopeless work, save by compass-bearing and timing the distance.

Descended into the Rong-kai, a fine gorge in the hills, bounded by precipitous cliffs on both sides; higher up towards its source, near the Nongmen, it is known as the Mairam, and is densely wooded for its whole course. The river was crossed by bamboo rafts, in deep still water. Both above and below this

point, precipitous rocks closed in the bed of the Rong-kai, so that it was impossible to follow it in either direction. The ascent from here was very steep, until we gained the top of a spur thrown off from Kylas, which we now saw again before us. I obtained a splendid point for sketching in the country, in a clearing at the end of this spur overlooking the valleys of the Sumessary and the Rong-kai, and squared up a large area. Rūngshū, where we breakfasted, was a short way along the same spur, and was a rather large place, with one or two well-built "bolbangs." That evening we got to the base of Kylas, to the site of my old camp, and pitched tent in the same spot in the dark sombre forest.

Started very early for Kylas, but on reaching the trigonometrical station, found the atmosphere frightfully thick from combined haze and the smoke of jungle fires; for all the clearings made during the cold season, and now well dried, are fired at this time. Many and many an hour of precious time have I lost waiting for a fall of rain to clear the air, and triangulation was in consequence terribly impeded after February. There was nothing to be done but to leave the remaining supplementary angles unobserved, and we returned, struck camp, and went back to Rūngshū. My fellow-traveller had, however, seen and enjoyed the magnificent view from Kylas; for haze, although against instrumental work, adds not a little beauty to mountain scenery, especially in the early part of the day.

On the 7th, descended through fine wooded slopes to Sèju on the Sumessary, a fine large village on the right bank; made a sketch of it while breakfast was preparing and the coolies and baggage were being ferried over. Capt. Williamson had now to see into a murder case; information regarding it had been accumulating, and we heard that the murderers were in the upper village of Sèju, and we were paddled up the deep reach in a "dug-out," with some police in another, and landing, the headman was called on to produce them; we had a great deal of talk, and the men not being produced or found, the headman was made a prisoner. I rather pitied the poor old man, for his own son was one of the murderers; and still more did I do so when I afterwards saw the son, a fine athletic young fellow and one of the best types of Gāro I had seen. Limestone slopes are not to be passed without a search for shells, and I made an examination in the shady side above the pool; their plenty is quite astonishing, and I collected in about a quarter of an hour some twelve different species, though none new, as I had previously obtained them in like ground elsewhere. After thus testing the molluscan wealth of the limestone rocks, the minuteness of some of the shells appearing to give

great amusement to my companion, whom I enlisted in my service as collector, we turned our attention to the rapid below the pool. I put up my rod and got good sport, taking one mahseer and nine basa, the last a siluroid fish, running about 1½ lb., which I had never yet seen rise to fly. They came at it most ravenously and afforded much sport, fighting most actively and vigorously. This would be a splendid fishing river later on after the first freshets. About 2 P.M. we dropped down the Sumessary in canoes to Rywuk, reaching our old camp just about sundown, thus completing the circuit of our most interesting and pleasant tour; and who would not envy the life of a surveyor or district officer in a mountain district of India? However hard the work, or however detrimental it may be to the constitution, it has charms and excitement no other kind of life can produce.

The 8th was our last day in the hills. Kundahs (dug-outs) fastened together into rafts took the whole party down the river to Shūshang; at the pool below Rywuk I took some parting casts, and landed some nice mahseer, one of which was rapidly transferred to the pot.

Williamson's work was completed by the police bringing in the two men concerned in the murder case, who had given themselves up, owing to the pressure brought to bear on them by the rest of their own community, and being now secured, the old headman was released.

The son was, at Shūshang, handed over to a party of the Khāsi police, who had some time previously come round to apprehend the men; for the murder having taken place in the Khāsi district at a village called Nongsopha, the murderers were well known, and had been seen.

It was the old story—revenge for some former wrong. I left India soon after, and so never learnt the fate of the well-made young fellow, who, unmindful of the terrible position he was in, poled our raft the greater part of the way down the river. One could not blame him; the part he had played was a part and parcel of a Gāro's duty, probably instilled into him by his own mother, and considered a right and honourable act by the men of his race. Is it right in us to carry out the full penalty of the law upon these wild tribes? and is it not best to attempt their improvement in the Andamans? where, if not improved, they can at least be made useful, until their natural death. Never tired of the ever-changing and lovely views as we dropped down the winding Sumessary—Kylas and the Túra ever towering in the background—we got into Agarkote just after dark, and thus passed away the last hours of the reconnaissance we had made.

GEOLOGICAL APPENDIX.

THE geological formations of the country are the same as seen in the Khāsi Hills, and have been described by Mr. H. B. Medlicott in a report entitled "On the Prospects of Useful Coal being obtained in the Garrow Hills, Bengal," and in his "Geological Sketch of the Shillong Plateau." We have a considerable thickness of cretaceous rocks resting on gneiss, capped by nummulitic limestone and later tertiary sandstones. These last, forming a very narrow belt at the base of the Khāsi Hills, here further west, form a broad belt of low ridges between the high metamorphic ridges and the plains. The section in the Um Blay, near Puna Tith, has been fully described by Mr. Medlicott, and I would refer the reader to his account of it. I followed up the first large tributary from the north-east after entering the hills, for about a quarter of a mile, to where the secondary sandstone forming the spur on the left bank ended, and is clearly seen abutting against a steep surface of the amygdaloid trap (the Sylhet trap of Medlicott). The massive distinctly-marked flows of this rock dipped 20° northerly, and rose from here on both sides of the ravine precipitously and high above the sedimentary rocks. These last have a very slight inclination south, and appear to be here quite cut off by the trap. This point is the most westerly known extension of the Sylhet trap, for I have never come across it in the Gāro Hills in any part I have visited, and I do not think it will be met with there; it occurs, too, where a decided change in the physical aspect of the whole mountain mass westward takes place, where the sedimentary rocks are less disturbed, and less elevated above the sea-level.

I found fossils in the same relative position as those mentioned by Mr. Medlicott, viz. in the lowest beds; these differ much in composition from the lowest beds we find a short distance north and west, where they rest immediately on the gneiss. The fossils were by no means numerous, but scattered through the rock here and there, so that it would take many days of hard stone-breaking to make anything of a collection. The secondary sandstone rises in a precipitous bluff to the west of Puna Tith, overhanging the Um Kanchiang River, and a broad plateau of hard sandstone beds, covered with scanty grass and but few trees, extends all the way to Nongkulang. Only in one place was a thin outline of nummulitic limestone seen; but at Mao-ma Si, about 2 miles north-east of, and with the rise in, the Nongkulang Hill, it is seen in considerable thickness, 420 feet, the lowest bed at base of the hill being 1340 feet above the sea. At 1760 feet fossiliferous sandstones succeed, and of these 150 to 200 feet cap the ridge, and are richer in the higher beds. There is a decided thickening of these sandstones south of the ridge, within a very short distance, for massive bedded, coarser, and non-fossiliferous beds come in, resting on limestone, the upper level of which is reduced to 1480 feet, and this difference of 280 feet is greater than the low dip of about 5° will allow for, and marks an unconformity in the two deposits. The above section is seen in the first large ravine on path to Purjonkha. A ridge of secondary sandstone bounds this on the west, and crossing it, the nummulitic limestone is seen again dipping 18° west, marking a low north and south roll in the beds.

A very interesting section is presented under Pundengroo; the steep scarp of this hill bears north and south, rising some 1700 feet from the bed of the Um Túngkút, a tributary of the Um Blay. In the bed of this river rolled pebbles of gneiss occur, and 200 yards from its junction with the Daokikha the limestone beds are seen, and turn up at 15° N.N.E.: it is here of no great thickness, perhaps 200 feet, and rests apparently conformable on secondary sandstone, as one ascends the ravine; the section is then lost, but a quarter

of a mile further on in the bed of the same ravine, where the path strikes it, the sandstones, now close under the scarp, are as much as 70°, and 200 yards further are perpendicular, strike N.N.W. Coal-beds here occur, and an excellent section is exposed in the bed of the stream and on the steep left bank. The section measured here from E.N.E. to W.S.W.:—

	Feet.	In.
Sandstone	unknown.	
Coal	4	0
Sandstone	6	6
Coal	6	0
Sandstone	10	0
Coal	8	0
Sandstone	18	0
Thin carbonic shale	0	9
Sandstone	7	0
Coal	3	0
Sandstone	unknown.	

Or about 20 feet of coal, for the beds are not very regular in thickness.

This north and south uniclinal bend of the whole mass of sedimentary rocks has consequently produced the Pundengroo scarp, such a marked physical feature of the country, and carried the secondary rocks to a much higher level than they are found on the east towards Pūna Tith. Following the ravine up above the coal section, the massive sandstones are reduced in dip to 30° E.N.E., and rest on gneiss, and a short distance further, at the base of the scarp, are almost level. Near the top of the scarp some inferior shaly coal was seen lying about on the surface occurring in the highest beds, but the nummulitic limestone does not occur, and is nowhere seen on the ridge all the way to Kylas, and not until we reach the valley of the Sumessary, denudation having removed it and the highest beds of the cretaceous rocks.

East of Pundengroo is the deep valley of the Mahadeo River. The limestone was seen in its usual position above Emdūng, 5 miles from its embouchment into the plains, dipping 25° south. I was unable to follow the valley higher, and to observe the section near the junction with the secondary formation. In the fine cliff sections exposed at the extreme head of the valley, coal was seen in extensive beds, and ten well-marked ones were counted. The cliffs cannot be less than 1000 feet high. The thickest bed, certainly not less than 10 feet, lay about half-way up, with two well-defined beds of less thickness just above and within 30 or 40 feet of it. Time did not admit of a closer inspection; it would have been a long and difficult matter selecting and opening a path into the deep gorge where this section is to be seen. Here is the finest and most extensive development of the cretaceous coal in this part of the hills; and from the appearance of the beds and the long distance they can be traced along the face of the cliff, I am inclined to think they may at some future time be turned to profitable account. That in this area they have a considerable horizontal extension is proved by their presence along the line of ridge to Pundengroo, in the Bao Tith or Um Tith just north of that hill, where the bed of the stream is full of large blocks of coal brought down from above. 10 miles east, near Nongkerasi, north of Nongkulang, the section mentioned in a former paper,* finds an equally thick coal series which thins out on the east. It is certainly the most extensive cretaceous coal deposit in the Khāsi-Gāro Range; unfortunately the beds lie in a part of the hills almost uninhabited, and are at a somewhat considerable distance from the plains; the distance is, however, less than from the beds of nummulitic coal at Cherra

* In the 'Journ. Asiat. Soc. of Bengal,' 1870.

Poonjee to the base of the hills at Teria, to where coal is taken in small quantities, and the descent is much less. The beds in the Mahadeo valley are greater in extent than the Cherra coal-beds, and are the most accessible, if a road were made to Emdūng, water communication with the plains existing here for several months in the year.

In the Gonassery the sections exposed along the outer line of the hills, showed the tertiary rocks to dip about 60° south, the dip increasing towards the plains. These sandstones continue the whole way to above Kūnchūng, thick-bedded and soft, mostly of a pale grey colour, with but few strings of pebbles. The high dip seen in the outermost section sinks to 10° s. and s.s.w., here and there almost horizontal, and I did not observe a northerly dip; a series the whole way of low uniclinal waves. At Kūnchūng a dip of 20° was succeeded by nearly horizontal strata; two miles above Kūnchūng more shaly and finer beds are seen, and a salt-spring occurs. Just beyond this, the nummulitic limestone is separated from the thick-bedded tertiary sandstone, by a considerable thickness of hard, blue, nodular clays, dipping 65° to 70° south-westward. The limestone that succeeds is of great thickness, and the bed of the stream, which has cut its way through it, becomes quite impassable. The limestone beds, at first dipping 50°, bend sharply over for 200 yards, with a low northerly underlie, and again resume the original high south and westerly inclination.

The steep spur that has to be ascended to avoid the rocky bed of the river, is of secondary rock, and the path descends to the junction of the Rúngnú, a large stream; this and the Gonassery mark the junction with the metamorphic rocks. The salient angle between the two rivers is a steep slope of gneiss, the edge of a considerable plateau, on which rises the imposing mass of Kylas, secondary sandstone, nearly horizontal and 500 feet thick. Immediately north of the village of Chikmūng is another but smaller mass of the same formation, called Daogūrūng, and between that and Kylas is a road to Rūngshū and the valley of the Sumessary. No coal is seen in the Gonassery section of the secondary series. Between the edge of the metamorphic plateau and the base of the sandstone mass, the lowest beds are seen in outliers near Chikmūng; they consist of coarse blue and purple sandstone with quartz pebbles of small size, very hard and compact where it rests immediately on the gneiss, and might be taken for it on a casual glance. It is quite similar to some beds at base of secondary series seen on the high plateau of the Khāsi Hills to the east and north-east. Crossing the watershed at the head of the Gonassery, the secondary sandstones are found dipping towards the east, still resting on the gneiss; this upthrow carries them to a higher level than at Daogúrúng, and finally they overtop all at Kylas, the uppermost beds being as high as the highest part of the Western Túra range of the metamorphic rocks. The upper beds are fine and contain very few pebbles. Near the eastern summit of Kylas, at 2341 feet, very thin carbonaceous shales are met with on the path, showing that the coal fines out westward. North of Kylas, near Rūngshū, the cretaceous rocks occur in two outliers upon the metamorphic spur, gradually falling with a low northerly dip. On the west they bend over in that direction sharply, and disappear under the horizontal nummulitic and newer sandstone in the valley of the Sumessary near Rywuk, *vide* section sketched in Mr. H. B. Medlicott's paper. To the west of the Sumessary, north of Rywuk, cretaceous sandstone again composes some outlying masses at a high level near Baduri, and on descending into the valley of the Rūngūdū, north of the metamorphic axis of elevation, they are met with again at a far lower level considerably disturbed with a high s.s.w. dip; following this valley up to Lenksram, it thinly caps the hills on the north, and continues to Chibong Giri, occurring upon a N.N.E.-S.S.W. minor lateral axis of elevation in three conspicuous thick outliers. West of this, at Chibong

Giri, thin beds cap the metamorphic, and have a westerly roll. All these lowest beds north of the main Túra axis are much changed in composition, are much finer, and show a considerable thickness of a pure, white, soapy, kaolin-like rock. North of Chibong Giri the sandstone terminates abruptly with the Shemshang River, which has cut down into the gneiss. North of Kūtchú, on the Sumessary, the secondary sandstones have the same relative low position, and are horizontal, the steep extremely straight lines of bluff in which the plateau terminates, giving a very characteristic appearance to this part of the river. Still higher up the Shemshang, horizontal sections are seen in the low banks of that river up to Rong-reng Giri; but closer into the main range of the Túra they dip south, and such a section can be seen near the junction of the Rungrhi with the Sumessary on the path to Surramphang, where it is 20°. The general horizontality of the sandstones has given the country on the Upper Shemshang the character of a flat, wide, open valley of considerable extent—a good example of how physical features are affected by geological structure. On the north bank, the plain is a good deal cut up by small ravines concealed by the forest that covers the country. The extreme northern boundary of the sedimentary rocks is, however, reached with the ridge of gneiss running from the conspicuous and isolated hill of Mūngrhi to Shokadum; a section at the junction was not obtained, but such a sudden termination of horizontal beds would probably be against a rather steep face of the metamorphics. Mūngrhi is gneiss of the kind seen in the Khāsi Hills, of which Kollong rock is a good example (porphyritic).

The Mūngrhi mass extends thence in a direct north-easterly direction, and forms the northern steep scarp bounding the Mandu River, carrying it directly into the same relative position this rock holds in the northern face of the Khāsi Hills. From this ridge (the main watershed) the whole extent of hill-country is of the metamorphic rocks. It differs in one respect from the Khāsi side—no intrusive rocks were seen. I traversed the whole line to Mejolgiri along the valley of the Chichira, where, if trap occurs at all, it could not fail to show in the débris on either side of the valley or in the bed of the river.

The beds seen above the nummulitic limestone near Rywnk, and which compose the Agal ridge to the west of the Sumessary, are the same as the supra-nummulitic first noticed by me at Nongkulang, and I propose to designate them the Nongkulang series; the fossils are identical. It is here quite conformable, no local unconformability being seen, as occurs in one or two spots on the east. Also over a large area, no marked line of separation can be found between the nummulitic limestone and the cretaceous sandstones; they appear quite conformable.

There is evidence, I think, in all the sections, that the cretaceous rocks were deposited on an originally sloping surface of the metamorphics; that the isolated masses of stratified rocks now seen dotted about the country owe their origin and permanence to very local elevations on the upheaval of the whole mountain system, and, being more yielding, were carried up, falling over into more or less sudden unclinal bends. The steady dip of the strata away from Kylas, seen east and west of it, particularly on the south, is an instance of a very local dome-like upheaval of that mass. The unequal elevation of the whole range has produced the north and south dislocations marked by the great and repeated changes of level in the base of the sedimentary rocks so well displayed at Pundengroo, at the head of the Mahadeo, and between Kylas and Daogūrūng, these marked also by the lateral valleys. The Sumessary marks the greatest line of rupture, all the sedimentary deposits being greatly lower on the west than on the east; and this line is continuous, taken up by the courses of Rungdi and Chichira to Damra, at the base of the hill system on the north. Medlicott's conjecture of a bend in the crystalline rocks at Sèju to form the base of Kylas, and thus bringing in the cretaceous, is proved correct.

In this section of the hills, we have, looking at their general physical construction, two main lines of elevation,—the northern and principal from Laubersat, on the main watershed of the range on the south-east, continuing north-west to Damra and Gwalpara; the southern, the Túra, from Nongkulang, Kylas, Mimanram, with a direction from E.S.E. to W.N.W. Intermediately, a third and subsidiary, with a more north-westerly trend than the last, extending from Kokhlam, Lumdekor, to Mūngrhi, well marked by the northernmost extension of the cretaceous rocks. West of Mūngrhi it forms again a portion of the main watershed of the hills, and this line, extended north-west, falls on Doobri, the last western outher of the crystalline rocks. The south-east, north-west, lines of main watershed are connected by portions nearly at right angles, or with north-east, south-west directions. The main drainage lines, from a certain regular arrangement and their intimate connection with undoubted dislocations, appear to mark a system of great joints, with former displacements of sections of the surface, which have occurred in the crystalline rocks. Everywhere are to be seen interesting examples of how subsequent denudation has affected the general aspect of these hills as they are traversed from west to east into the Khāsi and Jaintia districts.

Orographically there is a similarity which connects this area with the Himalayas on the north, as shown in the great longitudinal feature marked by the bend of the Brahmaputra, and successively by the Guddadhur, in the Dooars, and deep valley of the Mochu to Punakha in Bhūtan, of which the Wangehu is a supplementary feature or ramification. Again, the deep breaks through the Gāro range, of the Sumessary and Um Blay, which together throw the watershed of the range to within 10 miles of its northern base, have corresponding great gorges in the Bhūtan Himalaya, viz. the Champanotee or Matteesum and the Manāss. While proceeding east to long. 93°, we have the next great geographical depression, with corresponding geological changes, marked by the Kopili, having as its *vis-à-vis*, on the northern side of the Assam valley, the river Bhorolee. Such features cannot, I think, be accidental, but must be connected with past orographical movements on the contraction of the earth's crust.

II.—*On a Projected Railway Route over the Andes, from the Argentine Republic.* By R. CRAWFORD, M.A., C.E.

[*Read*, December 9th, 1872.]

IN compliance with a request that I should endeavour, while engaged upon the surveys for the proposed "Transandine Railway" from Buenos Ayres to Chile, by the "Planchon" Pass, to collect all such information as would be of interest to the Royal Geographical Society, I beg now to forward the results of our explorations and observations.

I have had a map of a portion of Chile and the Argentine territory carefully compiled to a scale of $\frac{1}{600000}$, and the results of our surveys and explorations marked upon it. On examination it will be found that some important geographical knowledge has been added to previously existing maps. For instance, the Rio Grande, which takes its rise in the Andes and,

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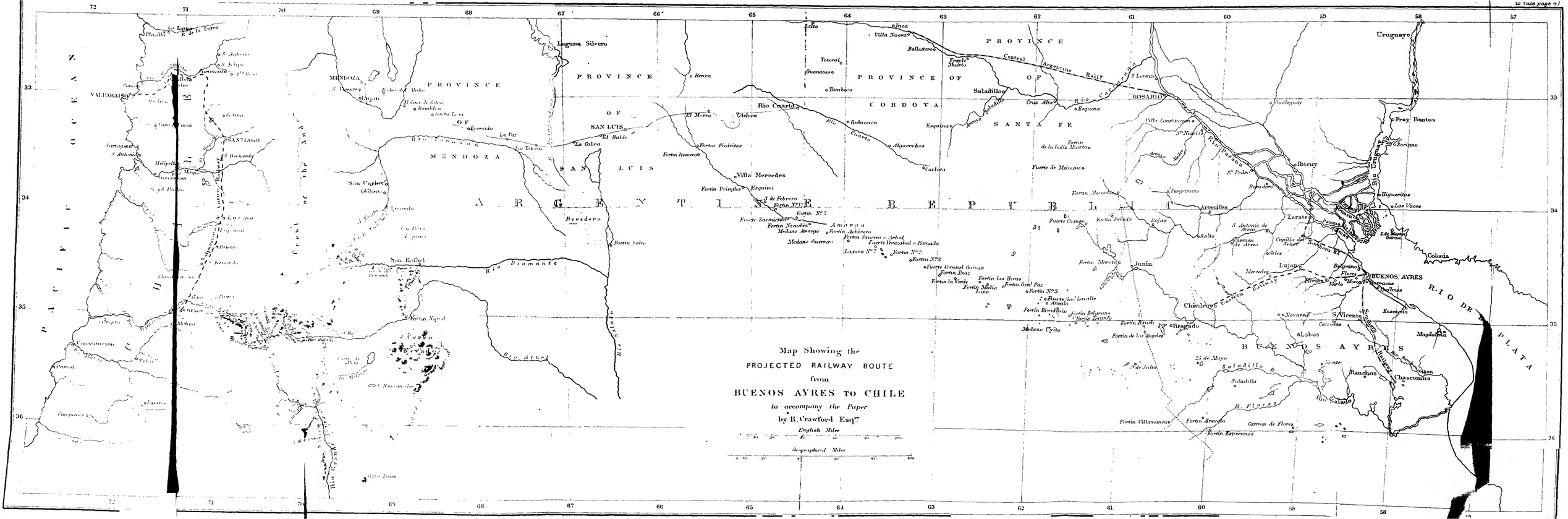


after receiving the contributions of various tributary rivers, flows through the Pampas and falls into the Atlantic at about latitude 39° 55′ s. under the name of the Rio Colorado, was found to be altogether different in direction and extent to what had hitherto been supposed.

This river has its origin from two separate sources. The less important one is that of the Rio de los Ciegos, a very small stream, which takes its rise within one hundred yards of the watershed of the Atlantic and Pacific Oceans at the Planchon Pass; after a short and unimportant course this rivulet takes the name of the Azufre, which in its turn is changed to that of Valenzuela, and this latter again loses itself at its confluence with the Tordillo (about 20 miles from the watershed), the united waters of the two rivers taking the name of Rio Grande. The other and more important source is the Rio Tordillo, which, springing from near lat. 35° s. and long. 70° w., receives in its course the waters of the Rio del Cobre, Rio de Santa Helena, Rio de las Vacas, and Rio de las Cuevas, and of some minor streams, and terminates, as already explained, at its junction with the Rio Valenzuela in what then becomes the Rio Grande. From this point to where the Rio Grande left the mountains and entered upon the Pampas was supposed to be approximately 81 miles, occurring (according to the map of Señor Rossetti, professor in the University of Buenos Ayres, which was published in 1870) in about lat. 36° 3′ s. and long. 69° 25′ w., whereas it has now been explored for a distance of 142 miles down its course, and even then there was no sign of its leaving the mountains and entering on the Pampas, as it was reported to do at the much shorter distance of 81 miles. It was traced down as far as lat. 36° 42′ and long. 69° 43′, when the exploration of the valley had to be discontinued, in consequence of the absence of all vegetation and the impossibility of procuring food for the mules (the ground being covered with volcanic scoriæ and cinders). Some new rivers flowing into the Grande (not shown on other maps) were met with, and marked down in their correct positions. The most important of these being the Rio Chico, which is almost as large as the Grande itself at their point of junction. With regard to the mountains and hill shading shown upon the map accompanying this letter, I have preferred merely to have the results of our surveys and explorations given, as information the correctness of which we were not certain of would be of but little value to the Geographical Society.

Before I left England in March 1871, the Assistant-Secretary of the Society requested that particular attention should be paid to the physical character of the eastern side of the

Andes. I consequently availed myself of every opportunity for making notes and sketches of these mountains, which, although very rough, serve to convey a correct idea of the character of the Andes from Mendoza to the Planchon Pass.

As to their geological structure, they are principally of igneous origin; numerous extinct volcanoes are to be found among them, but the only active one we saw was the Planchon, which geographers call Petroa. Basalt, lava, pumice-stone, volcanic ashes, scoriæ, and cinders abound on every side; but stratified rocks are also to be found, limestone and sandstone occurring in various places. Granite, as far as we saw, was not of frequent occurrence. Many of the mountains consist of a soft rock, in character somewhat like chalky clay, which, from exposure to the air, is very much worn, the softer parts falling away and the harder alone retaining their positions, assuming in many cases fantastic shapes like the Gothic turrets of some old, time-worn castle or church.

The variety of colouring in the soils which compose the mountain slopes is sometimes most striking and beautiful, blue red, yellow, and white meeting in strong contrast (not shaded into each other), producing a wonderful effect. This is in a great measure due to the almost total absence of vegetation, which is scarcely anywhere to be found among the Andes, except in the valleys and near water. Along the eastern slopes not a tree is anywhere to be seen, except an occasional one in the most sheltered and protected spots; but a coarse kind of brushwood is common in many places.

To turn now to the Pampas. They have been so often described in books of travel that but little is left to be said of them. They are vast plains marked by but slight undulations near the sea coast, but becoming more uneven and broken in their surface as the mountains are approached, and on the eastern half of the continent they are generally rich and fertile, covered with high grass, but almost totally devoid of trees, the few stunted specimens which are met with at rare intervals scarcely deserving to be noticed.

Some peculiar-shaped sand-hills occur in different places. They are called "Medanos" by the natives, and are generally hollowed out in the centre to an equal or greater depth than the surrounding land. They frequently encircle small lakes. In one of them, where there was no trace of there ever having been a settlement, we found potatoes growing wild. They were very small; we had some of them cooked for eating, but they were scarcely old or ripe enough, and from this same cause those which we tried to keep as specimens, decayed.

Nearly all the lakes we passed on the Pampas were salt,

and the same peculiarity attaches, to a great extent, to the rivers in the same locality. This is especially the case during dry seasons, but after heavy rains, when the rivers are flooded, they can sometimes be used for drinking-water, being at such times less impregnated with salt.

The only rivers met with, until more than half the continent was crossed, were the Salado and the Rio Quinto. I think, however, that it is extremely doubtful whether they do not, in reality form but one river. The Rio Quinto loses itself in a large marsh called the Amarga, or rather it becomes absorbed in the loose sandy soil which forms the Amarga, and not far from the same place the river Salado takes its rise. It is, therefore, I think, highly probable that the water passes through the porous soil from the one river to the other.

The Rio Quinto, following the reverse to the ordinary rule of rivers, becomes more important as you proceed up it. When we travelled along it the season was very dry, and there was little water in its sandy bed; during floods, however, it must be a large river. At Mercedes it has cut a channel 1270 yards wide and about 20 feet deep, and within this again, another still deeper, 890 yards across and from 6 to 7 feet deep, below the bottom of the other channel. The sand in the bed of the river is mixed with innumerable small scales of bright yellow mica, which give it a rich and dazzling appearance.

Until the Rio Quinto is reached, and along its course, the soil is fertile, but between the provinces of San Luis and Mendoza there is an extensive desert covered with but little else than pure whitish sand. Towards the mountains the soil becomes mixed with gravel, and, with the exception of where it receives irrigation by natural or artificial means, it is not fertile.

The average height of the plains, at about 100 miles west of Buenos Ayres, is from 150 to 160 feet above the sea-level, and it rises to about 2800 at the foot of the Andes. The highest point of the Planchon Pass, at the summit of the range, is 8225 feet above the sea.

It may be well to guard against a possible misconception arising with regard to the frontiers of the Argentine Republic. There is a line of forts, but these are generally a few mud huts collected together and a small ditch dug around them to prevent the Indians, who seldom dismount from their horses, coming into them. Many of these forts have only from 6 to 8 or 10 soldiers in them, others 20 to 30, and a few from 200 to 300; whereas at the Villa Mercedes, the only place of importance along the whole line, there are generally upwards of 300 troops stationed, it being the headquarters of the general commanding-in-chief on the frontiers. There are, for the most part, no

settlers anywhere near the frontier, and the Indians pass in and out at pleasure.

The frequency of these invasions, especially of late, has been such as to draw down the almost universal condemnation of the press on the administration of the War Department, and it is not unlikely that energetic measures may be adopted by the Government for the better protection of the frontiers.

The principal animals met with were small deer (*Cervus campestris*), which were very numerous on the plains, as were ostriches (*Rhea*), vizcachas, foxes, Patagonian hares, large lizards (4 feet long), and two or three species of armadillo. Among the mountains guanacos abound, and an animal about the size of a small cat, like the chinchilla in colour and appearance, was seen; it was called by the natives the rock vizcacha. Some wild cats were also met with on the plains; and pumas, both on the Pampas and among the mountains, but none of the party saw a jaguar during the entire journey. Condors were very numerous among the Andes, and some eagles were seen. On the Pampas, three different kinds of partridge were met with, as were also blue eagles, black bald-headed vultures, other vultures, and a great variety of hawks, and three or four different kinds of owls. Many kinds of wild ducks frequent the lagunas, as do also white herons, storks, rose-coloured flamingoes, and hornbills, besides various kinds of ibis and small white egrets with most delicate plumes. Where trees were found, wild-pigeons were exceedingly numerous, as were also doves and small green parrots.

No wild cattle were anywhere to be seen, and only on two or three occasions were wild horses met with, and then in very small numbers. I have endeavoured to touch upon all the points of interest in connection with the expedition, and I hope that the foregoing, taken along with my report, may furnish some information not previously known.

EXTRACTS FROM MR. CRAWFORD'S OFFICIAL REPORT.

We left Mendoza upon the 17th February, and, marching by way of San Carlos, eventually succeeded in joining the Chilian party in the valley of las Leñas Amarillas on February 29th.

Upon learning the results of their work up to that time, it appeared that a practicable line had been found over the Planchon summit, although its height above the level of the sea proved to be 8225 feet.

During the progress of the surveys of the preceding season, although the line did not reach the summit, it became perfectly evident that the rate of inclination of the western slope of the Andes, and the height of the Planchon Pass above the sea, were both very much greater than what had previously been supposed. The next step to be taken was to see if any tributary valley to the Teno offered greater facilities for ascending the mountains. Upon examination, the only one which afforded any prospect of success in this

direction was that of the Rio Claro; but, although very favourable for a considerable portion of its length, towards its source the rise is so rapid that all idea of this route had to be given up.

There remained no help for it but to abandon a considerable portion of the line which had been traced up the bottom of the Teno Valley, near the river's edge, and to endeavour, by rising gradually along the higher sloping ground on the hill-sides, and by a zigzag course in the narrow gorges, to attain to the required elevation, which was successfully accomplished.

From the summit downwards, on the east side of the mountains, for a considerable distance, no difficulty of importance presents itself; the line naturally following the course traced out for it by the rivers Ciegos and Azufre. It is not until after it enters the narrow and tortuous valley of the Valenzuela that important obstacles are met with. These arise principally from the very sidelong nature of the ground and the rapid fall of the river, which is in reality a mountain torrent; towards its lower end this valley becomes less difficult for railway construction.

Up to this point there is no choice or selection as to the route to follow, there being but one practicable line; but here the opening in the mountains, through which the River Tordillo flows, seemed to offer a prospect of obtaining a tolerable direct line to San Rafael; consequently the party, as already stated, surveyed up the Rio Tordillo, through the Valley Hermoso, and over the lowest part of the watershed which separates the streams flowing respectively into the Tordillo and Salado, in all a distance of 45 kilometres from the junction of those rivers, from which point downwards their united waters take the name of the Rio Grande.

Unfortunately the height of this summit proved to be considerably more than that of the Planchon Pass itself, and the distance across it so great as to render the route practically impossible for a railway.

We therefore moved towards the valley of the Rio Grande on the 3rd of March, a military escort of twenty men having joined us the previous evening.

Upon reaching the Rio Grande, two surveying parties were formed to work independently of each other, so as to expedite the progress of the survey. I accompanied the lower one, and penetrated as far down the valley as it was possible for me to go, bearing in mind that I had to return and pass over the Planchon into Chile, and that the middle of March was considered to be the latest date to which this could be deferred. Subsequently these explorations were extended much further, and the Rio Grande examined for a distance of 135 English miles down its course; and even then there was no sign of the Rio de las Barrancas, or of a termination of the mountains and the river entering on the Pampas (which is shown on maps as occurring at a distance of only 81 English miles from the junction of the Tordillo and Valenzuela). The valley of this river, which at first presents a fine open appearance, is frequently narrowed, and in many cases almost closed in, by high mountains approaching the water's edge. There are some open spaces along it at intervals, but it is by no means an easy valley through which to trace a line of railway, and towards its lower end it becomes almost inaccessible; the river cutting its way through rugged igneous rocks with perpendicular cliffs on either side, and nothing but scoriæ and the debris of extinct volcanoes covering the ground, and obliterating all traces of vegetation.

Throughout the entire 135 English miles there is but one place where a railway can leave the Rio Grande, and that is at one of the open spaces before referred to, known as the 'Llano Blanco.' At the head of this the Chinqueeo, flowing into the Grande, has cut its way through the more abrupt mountains which shut in the latter on both sides.

This place, which occurs at kilometre 130 on the survey line, was selected

as the point at which to diverge from the Rio Grande; but, as there seemed to be two directions, either of which might be taken, both had to be surveyed in order to determine which was the better.

One was up a stream called the Vatra, and the other by the Chinqueco. The former gave very good gradients as far as the summit called Vatraco, on the east side of which, however, the descent was so abrupt as to render it impracticable. The line by the Chinqueco had therefore to be adopted.

On approaching the source of the last-mentioned stream the railway pierces, by means of a tunnel 1600 yards long, through the summit known as the Llano Blanco Pass, entering on the other side into the valley of the Arroyo Pota-mayim, and thence, descending by the Manzano and Malargue, crosses from the latter to the Rio Atuel at a short distance below this river's junction with the Rio Salado.

From this point the line follows approximately the course of the Atuel till nearly reaching San Rafael, which it approaches through the valley of the Pintada, crossing the Rio Diamante just below the town.

Another and a shorter line into San Rafael was examined and surveyed, but the gradients and works upon it were so heavy as to cause it to be abandoned in favour of the one which was adopted.

Previously to this I had, as already intimated, left the lower party of engineers to continue the surveys to San Rafael, and thence to the point in the Pampas where they had been abandoned; and, on the 15th of March, I joined the staff from the west coast, and accompanied them back to Chile over the Planchon Pass to the Teno Valley, following the line which had been surveyed for the proposed railway and examining it carefully.

I left Valparaiso on the 14th of April, per steamer, for Montevideo, but, upon reaching the latter city, I was unable to proceed to Buenos Ayres till the 11th of June, owing to that port being closed to all persons coming from Uruguay, in consequence of an outbreak of yellow fever at Montevideo.

Upon the surveying party, which I left on the east slope of the Andes, having reached San Rafael with the line, the Government of Buenos Ayres, considering it unnecessary to proceed further, issued instructions, through the Governor of Mendoza, to discontinue the work, which was accordingly done; the staff returning to Buenos Ayres, where the last of the expedition arrived on the 29th July, 1872.

The total distance from Buenos Ayres to Valparaiso by the proposed route is 1103¾ English miles, of which there are already constructed 319¾, leaving still to be made 784 miles.

Character and Peculiarities of the Soil.

For some distance after leaving Bragado the land was of an inferior quality, but it gradually became better, and the Pampas, as far as the survey was continued, may be considered to be generally rich and fertile. There are very few "Pajanales," and high Pampas grass only occurs at intervals in isolated clumps. There is, however, a great scarcity of good water in the country we travelled over, for the want of which the party suffered much during the first part of the journey. We had to sink wells, in which we generally found drinkable water at depths of from 16 to 21 feet. The surface-water collected in "lagunas" is generally so salt as to be unfit for use.

Shortly after the survey had to be abandoned, and on the 29th of November we met with a low-lying tract of land known as the "Amarga;" it is covered with high coarse grass, and is of vast extent. We penetrated into it for a considerable distance, and at last reached the bed of the Rio Quinto, which loses itself here, or more properly is absorbed in the sandy soil forming the Amarga.

The country to the south of the Amarga exhibits a more rolling and uneven surface than we had hitherto met with on the Pampas.

From this place we followed the direction of the Rio Quinto upwards, its banks becoming gradually fringed with trees, which in the neighbourhood of Mercedes cover a considerable area.

From Mercedes to San Rafael our route (for reasons already explained) lay so far from the proposed survey-line, that it would be useless, and might possibly be confusing, to introduce a description of the country travelled over into a Report on the Transandine Railway.

As the mountains are approached the soil becomes less fertile, being light and sandy with a slight mixture of gravel, of which the substratum is composed; when properly irrigated, however, it can be made to produce fine crops, and assume the appearance of luxuriant vegetation. Mendoza and the "Potreros" about San Carlos are good examples of what may be done in this respect.

From San Rafael to the mountains the soil in the open country is of the sandy mixture just described, interspersed with rugged portions where sand, gravel, and loose earth cover the surface. There is also a great deal of brushwood in many places.

Along the margins of rivers and streams there is frequently good grass to be found, but elsewhere it is of an inferior, coarse quality, and by no means plentiful. In the valley of the Rio Grande there are not many places where really good grass can be found, but along its tributaries and those of the Tordillo the grass is much better, and large quantities of sheep and cattle are there fattened during the summer season, being for the most part driven over to Chile as the winter approaches.

At Mendoza these valleys are known as the "Potreros" of the Cordillera, and are considered wonderfully fertile. The right to graze cattle in them is let from year to year by the Government of Mendoza, the tenants (called internadores) being usually Chilian subjects. Some of them remain the whole year round, but few of those were met with, and nearly all the rude habitations that were passed by the surveying party appeared to have been recently deserted, no doubt for the winter months. This was not surprising, considering the lateness of the season when the expedition reached this point.

Along the valley of the Valenzuela the grass is better, but towards its upper end it is very poor, and when the Azufre is reached the soil becomes exceedingly barren and the country desolate, the surface of the ground being covered with minute volcanic scoriæ. The hill-sides are totally devoid of vegetation, and only in the vicinity of water is any green thing to be seen.

Upon passing over into Chile the aspect of the country gradually improves. The valleys are at first exceedingly steep and narrow, but they soon assume a less rugged appearance; trees are seen, first in small isolated patches of shrubs; afterwards in greater importance both as to number and size. The fertility of the soil becomes by degrees more pronounced, until by an easy transition the rich valley of Chile is reached.

Minerals.

On the west side of the summit, close to the line selected for the railway, are situated silver and copper mines, and lower down, near Cypresses, as also in the valley of the Claro, smelting-furnaces have been established.

These indications point with no uncertain hand to the confidence of capitalists in the hidden wealth of the Andes.

On the Argentine side I have heard of but one mine being worked—a copper lode of the Valley Hermoso. I can, however, see no reason to doubt that the eastern slopes conceal treasures of a similar character to these found in Chile;

all that is required to develop them being facilities afforded by means of communication with the outer works.

In the valley of the Chinqueco, through which the survey-line passes, a quantity of magnetic iron-ore was discovered in the sand washed by the river, indicating rich deposits of this metal in the strata through which the river has cut its way.

There is also a very important deposit situated about midway between the rivers Diamante and Atuel, not far from the base of the mountains. Here a well, springing from the side of a high hill, discharges large quantities of bituminous matter into the valley below. From it issues also a yellowish fluid resembling diluted petroleum, so that there is every probability that, were means provided for transporting it to a market, a large trade would arise from this source.

The Cerro Payen, to the south, is reported to be exceedingly rich in minerals, but we had no opportunity of judging of the correctness of these rumours.

III.—*Journey from Kiôto to Yedo by the Nakasendô Road.* By C. W. LAWRENCE, Esq., Second Secretary of Legation, Japan.

[*Read*, January 13th, 1873.]

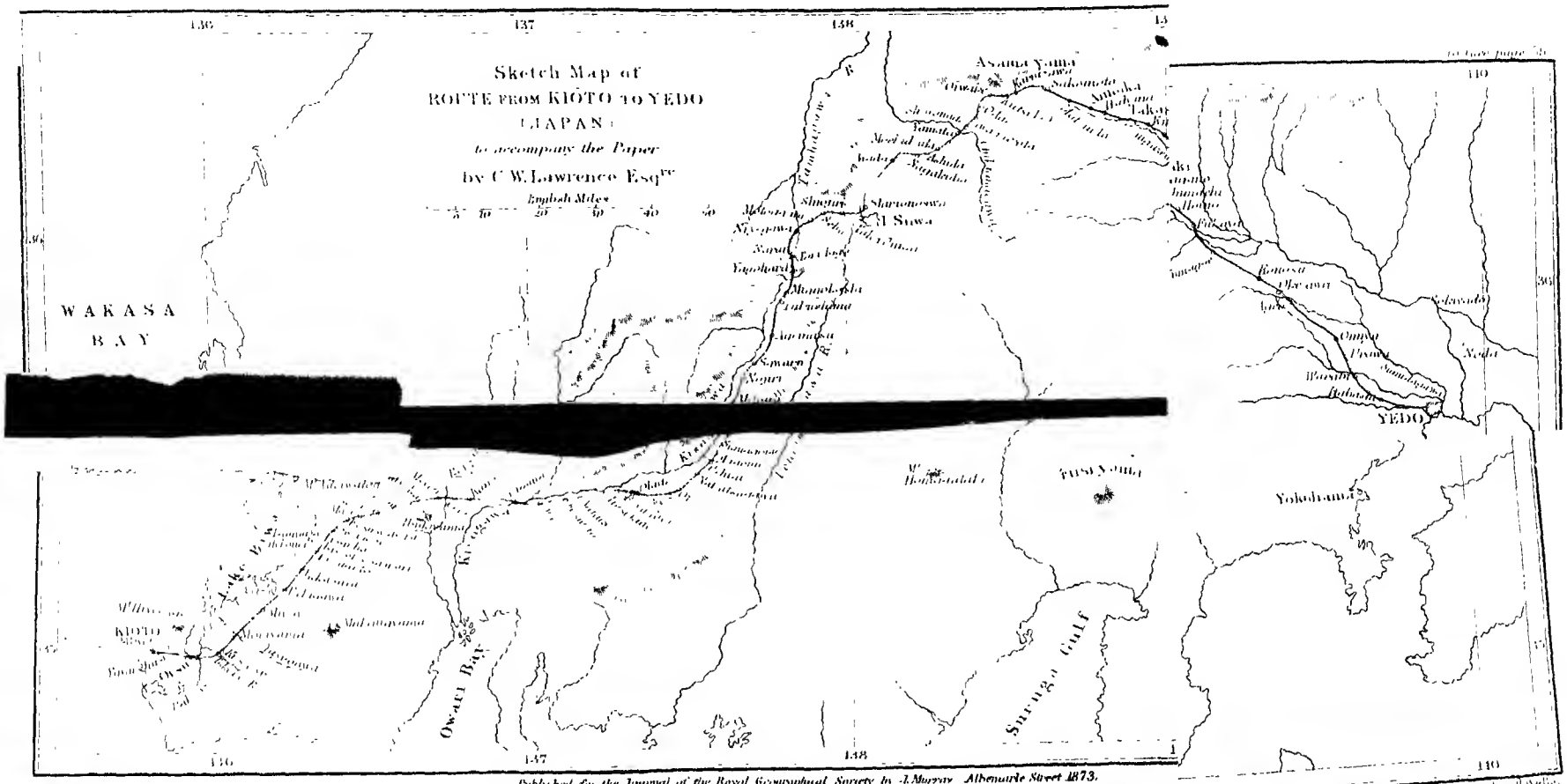
First Day.

Kiôto to Otsu .. .. 3 Ri.*

LEAVING Kiôto on the afternoon of the 18th of June, we stopped the night at Otsu, a little town on the shores of Lake Biwa, and only 7½ miles distant. The road is very pretty, it winds through the mountains intervening between the fertile valley in which Kiôto is situated and the Lake of Biwa. A little way out of Kiôto, about a mile from the road, on the left, is Yamashira, where are the remains of the Yashiki of Oishi Kuranosuké, the leader of the 47 Rônins,† and also the large temple of Yamashira Gobo. Otsu is a busy little town, and the resort of pleasure parties from Kiôto. In order to accustom the people to European ways, the Kiôto authorities ordered the construction of a European house, and the site chosen was on the shores of the lake, on the ground where a castle formerly stood. When the exhibition at Kiôto was determined on, this house was converted into an hotel, and, as a further attraction to foreign visitors, on fine nights there was a display of fireworks, and the garden was converted into a place of public resort. The view of the lake from the hotel is very pretty. On the left is Mount Hiyeizan. The scenery along the whole eastern shore of the lake is very fine. It is either called the Lake of Omi (the

* The Ri is equal to 2½ English miles. 36 Chô make one Ri.

† Vide Mr. Mitford's 'Tales of Old Japan.'



facilities afforded by means o

province in which it is situated) or Biwa, from the supposed resemblance of its shape to a Biwa, or native guitar. Its length is about 70 miles. Otsu is near the south-east end, and from here to the opposite shore it is not more than 5 miles across.

Second Day.

	Ri.	Chô.
Kusatsu	3	24
Moriyama	1	18
Musa	3	18

The shortest way of getting to Kusatsu is to cross the lake in a boat. By the road, however, there are several places of interest to be seen—the castle of Zézé, on the shores of the lake; the village of Awadzu, famous as the site of a battle between Yoshizaka and Yoritomo, rival Shôguns (commanders-in-chief), in which the former was killed. The Ujikawa* issues from this end of the lake, and is crossed by the bridge of Seta; from this bridge tradition relates that a famous archer, of the name of Hidesato, killed with an arrow a gigantic centipede who lived in Mukamiyama,† a mountain 10 miles distant. This centipede had devoured the offspring of a dragon who lived in the lake, and the dragon, transformed into a woman, persuaded Hidesato to avenge her. A little way down the river is the Temple of Tshiyama, from which there is one of the eight views for which the lake is renowned. At the entrance of Kusatsu was a post announcing that beyond this spot foreigners were not allowed to pass. The Tôkaido runs through the village of Kusatsu, the Nakasendô branches off to the left. A walk through several villages and past several large temples brought us to Moriyama, a clean-looking place, with the large Temple of Tomomi at the entrance to the village. We crossed the bed of a large river, the Yasugawa, where cotton was bleaching. In this district, besides tea and rice, hemp and cotton are grown. Our resting-place for the night was at Musa, in a country perfectly flat and uninteresting. Views of sand hills and distant mountains. Mukamiyama a few ri on the right.

Third Day.

	Ri.	Chô.
Echigawa	2	18
Takamiya	2	0

Prevented by heavy rain from starting till mid-day. Road perfectly flat the whole way and lined with trees. Numerous villages; crossed several dry river-courses. Between Musa and Echigawa is a large temple dedicated to Hackiman, the God of

* Kawa or gawa, Japanese for river. † Yama, Japanese for mountain.

War, and one called Oisono Mori, where the first man, Amano Royarenomikoto, is worshipped. Takamiya is famous for its hempen cloth, much used by the Japanese for dresses of ceremony.

Fourth Day.

	Ri.	Chô.
Torümoto	1	18
Bamba	1	6
Samagai	1	0
Kashiwabara	1	18
Masu	1	0
Sekigahara	1	0

Leaving Takamiya early in the morning we walked on to Torümoto; road perfectly flat, lined with Scotch fir and *Masoniana;* occasional glimpses of Lake Biwa. After leaving Torümoto the road ascends the pass of Tsurikari, and near the summit is the tea-house of Tanakakurayemon, whence is another of the eight famous views. Here one has a view of the broadest part of the lake. The high mountains on the opposite shore with the wooded island of Chikubu make a very pretty distance. In the foreground is the village of Isomura on the shore of the lake, and a little to the left Hekone, the residence of the regent Ikammo-no-kami. The road is very pretty all the way to Samagai, with a fine view of Ibukiyama. The honjin* at Samagai where we breakfasted was a very curious and ancient one. Just in front of it was a river, of the water of which Yamato Dake-no-mikoto, a paladin of ancient days, drank when poisoned by a devil, and was cured. The spot where he sat down to drink has a building over it. Our resting-place for the night was at Sekigahara, a place famous in Japanese history, as here was fought, about 280 years ago, a battle which gave the power to Tyéyasu, the first of the Tokugawa Shôguns or Taicûns. It ended a long series of civil wars, and from that time until the overthrow of the Tokugawa Shôguns in 1868, Japan enjoyed profound peace. The battle was fought between Tyéyasu and the troops of Hideyori, the son of Taikô Sama. About half a mile from the village to the left of the road is a stone platform with a moss-covered enclosure, marking the spot where stood Tyéyasu during the battle. It is at the foot of Mount Aikawatôge. On the opposite side of the valley is Ibukiyama, a mountain with the ruins of a castle near the summit. The battle was fought in the 15th year of Kaicho, on the 15th day of the 9th month. It lasted, our guide informed us, from early morn till night, and 10,000 men perished. A stone with a long

* A honjin is a halting-place, where formerly the daimios rested on their journeys to and from Yedo.

inscription in Chinese marks the spot where the heads of the chiefs slain in the battle were buried.

The boundary between the provinces of Omi and Mino is at Nemonogatari near Inasu.

Fifth Day.

	Ri.	Chô.
Tarui	1	18
Akasaka	1	12
Miyeji	2	8
Gôdô	1	6
Kanô	1	18

The first stage, road very pretty, lined with Scotch firs, *Masoniana*, &c. Four ri distant, in the mountain of Tadosan, is the waterfall of Yôrô, said to be one of the finest in Japan, about which there is a tradition that the goddess of the mountain caused water to gush forth, which was afterwards converted into saké, in order to please a dutiful child whose father was very fond of saké, but was too poor to buy any. Near Tarui a road branches off to Mino, and thence to Owari, passing the castle of Ogaki. At Tarui is the most important Miya or Shintô shrine of the province of Mino, dedicated to Kumigama Shiki Daijin, and in the mountain near is an iron tower, which was dedicated to the divinity by the wife of Yoritomo. The road from Akasaka to Miyeji is very uninteresting, perfectly flat, through paddy fields and across several small rivers with plenty of water in them. At Akasaka we were sold stone ornaments cut from a soft stone called Kinshoseki. Just after leaving Miyeji you cross a wide river in a boat, the Rokugawa, which is famous for cormorant fishing.

Sixth Day.

	Ri.	Chô.
Unuma	4	8
Ota		

Very long stage to Unuma, put down at 4½ ri; in reality over five. Kanô, our resting-place of last night, was formerly a castle town. Hardly any vestige left of the castle now. We had telegraph poles by the side of the road hitherto; a little way out of Kanô they turned down a road to the right, which joins the Tôkaidô at Miya. Road perfectly flat all the way to Unuma. Great part of the way traverses a pine forest. One ri from Unuma, to right of road, on the summit of a conical hill, is perched the Castle of Inuyama; after leaving Unuma the road enters a wild pass with a little lake on the left, and then a short and steep descent brings one suddenly into the valley of the Kisogawa, the largest river between Kiôto and Yedo. The

scenery was very fine, high mountains, covered with trees, on either side of the valley. The river rapid and broad, with half-a-dozen flat-bottomed boats sailing against the current. The Kisogawa enters the sea between Miya and Kuwana, as also the two rivers we crossed yesterday—the Kanôgawa and the Rokugawa. The Kisogawa is navigable 18 ri from its mouth. The road keeps close to the river the whole way to Ota. It crosses one little pass, the Kuannon-tôgé,* where is a rock-cut temple dedicated to the Buddhist divinity of that name. In the neighbourhood of Ota is a large pine forest, and 2 ri to the north is the celebrated sword manufactory of Kanemoto and Kanemitsu, and a paper manufactory a few ri to the west.

Seventh Day.

	Ri.	Chô.
Fushimi	2	0
Mitaké	1	5
Hosokuté	3	0
Okuté	2	0

Pine forest almost the whole way to Fushimi; formerly a castle town, and now a very small place. Near here, in the mountain, is the Oni-no-Kubidzuka, or burial-place of a devil, a noted robber of the name of Seki-no-Taro. We breakfasted at Mitaké, in a curious old honjin, built round a charming little garden. In the fourth stage the scenery was very fine; the road crosses the Biwa Tôgé, from the summit of which, on a fine day, Miya can be seen. We had gradually ascended for the last two days, and the scenery was quite different from anything that I had seen hitherto in Japan. The road traverses a barren country, with brushwood here and there, but no trees visible except the ancient *Masoniana* lining the road. The forests had probably been cleared away for firewood. No villages or houses to be seen, but in the bottom of the valleys paddy fields wherever possible.

Eighth Day.

	Ri.	Chô.
Oi	3	18
Nakatsugawa	2	18

After leaving Okuté the road rises rapidly and then follows the crest of the mountains, crossing several small passes—13 they say. On either side is a very extensive view, wild to a degree; a mountainous country, broken up into small valleys, with no trees but covered with brushwood. The road as usual lined with trees. The sun was very hot, but the great altitude made the air cool. After Oi, the road leaves the mountains

* Tôgé, Japanese for pass.

and follows the valleys; it crosses several small passes and then descends suddenly into the valley, in which Nakatsugawa is situated. This valley is very picturesque. It is encircled by high mountains. There are clumps of trees here and there and a few small villages. The town of Nakatsugawa consists of a single street, which stretches almost the whole way across the valley. We passed a great many ponies, which were being led away from Fukushima, where there is a yearly fair for ponies of the province of Shizano.

Ninth Day.

	Ri.	Chô.
Ochiai	1	0
Magomé	1	5
Sumagomé	2	0
Mitono	1	18
Nojiri	2	18

Ochiai, a quaint little town. Towns and houses in Riso quite different from other parts of Japan. Upper storey projecting beyond the lower; roofs of wood, instead of thatch, with stones on them. A stream running down the centre of street, which in some places we saw used as a public bath, both for men and women. Shortly after leaving Ochiai the road crosses the Yufunésawa, a rapid torrent running between wooded hills, and one of the tributaries of the Kisogawa. After crossing the torrent is the steep ascent of the Jikioku-tôgé, near the summit of which is the boundary between the provinces of Mino and Shinshiu, and a little temple dedicated to Irari Sama, where a wonderful ointment is sold, the secret of the manufacture of which was taught by the foxes attendant upon the god. The pass of Jikioku is a long one, and the scenery is very fine the whole way. The road crosses and recrosses the torrent; from the summit of the pass the view is beautiful whichever way you look. To the right is Mount Mesama, and before you the valley of the Ararai, in which is situated the little town of Sumagomé. Delightful walk on to Mitono and Nojiri, the approach to the former is curious; after crossing a torrent by many rickety bridges you come upon some huge boulders, which have the appearance of having once formed the base of a glacier. Near Mitono also is a large rock called the Koyéiwa, from its supposed resemblance to a carp. From Mitono to Nojiri the road skirts the side of a mountain, with the Kisogawa, here a roaring torrent, a few hundred feet below. Both sides of the ravine charmingly wooded. Some of the distant mountains look very high.

Tenth Day.

	Ri.	Chô.
Sawara	2	0
Agemasu	3	5
Fukushima	2	18

Although it was the 7th of July, yet Nojiri is so high that the night was delightfully cool, and we slept without mosquito-curtains. Road ascended the valley of the Kisogawa almost the whole three stages. From Sawara fine view of Mount Homagatake; this, with Ontaké San and Nagisogatake, are the three highest mountains of the range, which runs north and south across the greater part of Japan, separating the provinces of Shinshiu and Echigo from Hida and Etchiu. Of these Ontaké San is said to be the highest, but the height of none of them has as yet been accurately ascertained. Fuji, which the Japanese consider the highest mountain in Japan, is said to be a little over 14,000 feet, and, judging from the amount of snow on Fuji and Ontaké San in July, one would conclude that Ontaké San was the higher of the two. Fuji, however, is close to the sea, whereas Ontaké San is in the centre of the island.

Near Agemasu is the Temple of Rinsenji, overlooking the Kisogawa, which at the bottom of a deep valley, runs between some perpendicular rocks. On one of these is a little house called Nezamenosato, about which there is a tradition that a man of the name of Urashima one day saved the life of a tortoise, and as he was reposing here he was accosted by a damsel, who took him to her father's abode underneath the bed of the river, where he was entertained by a king, the life of whose daughter when transformed into a tortoise he had saved. He lived here 300 years, and was reminded of earth by a cock crowing; on taking leave he was given many presents, one of which was a jewelled box, which he was told not to open. He could not, however, resist the temptation, and he found nothing inside it, but from young he became suddenly old. Hence a beautiful box containing nothing is called "tamatobako."

Near Agemasu is a small waterfall. In former days Fukushima was an important place. Here used to be a barrier—an effectual means of preventing people going to and from Kiôto. It is considered the best post town on the Nakasendô. A road leads hence to the sacred mountain of Ontaké San, 10 ri off. It is much visited by pilgrims in the summer months. On the summit is an image of Ontaké, the counterpart of which is on the summit of the Tori Tôgé.

Eleventh Day.

	Ri.	Chô.
Mianokoshi	1	23
Yagohara	1	30
Narai	1	13
Niyegawa	2	0

During first stage had fine view of Kamagataké, near which is a mountain called Sishosan, where crystals are found, and in former days gold also. During the second stage we once more crossed the Kisogawa, and then saw it no more. Our route had lain close to it for the last five days. A little higher up the valley it is joined by the Mitake river. Between Yagohara and Narai is the steep ascent of Tori Tôgé, the summit of which is the highest point on the Nakasendô. From here one has a very fine view of Ontaké San and the other mountains of Shinshiu. This road is much frequented by pilgrims; the tea-houses at which they rest are adorned with banners, on which are inscribed the names of the different religious sects to which they belong. The rivers we now came to flowed towards the western coast.

Twelfth Day.

	Ri.	Chô.
Motogama	2	0
Seba	1	0
Shiojiri	2	0
Shimonoswa	3	0

During the first stage the road descends the valley of the Tamhagawa, a river which flows into the sea at Migata. About half way to Motogama is the boundary of Kiso. Between Seba and Shiojiri is the site of a battle fought between Takeda Shigen and Ogasawara, whence one has a very extensive view of the valley of the Tamhagawa. The scenery, however, very tame after the valley of the Kisogawa. The villages much more prosperous-looking. Shiojiri is a very picturesque little place; houses large, with gables; steep ascent after leaving Shiojiri, the Shiojiri Tôgé; charming view from the summit, on one side the Shinshiu range, and on the other the lake of Suwa and Fuji in the distance. Much pasture all about here, and one would think that sheep might be easily reared. The winter, however, is very cold, the snow often 9 feet deep, so that it might be difficult to find sustenance for the flocks in the winter.

The lake of Suwa is about 3 miles across, and is surrounded by hills. At one end is the castle town of Takashima, and near this issues a river called the Tenriukawa, which runs into the

sea near Mitske in Eushiu. Shimonosuwa is famous for the Miya of Suwa, and for some hot springs: one comes to the surface just in front of the honjin, and forms the public bath of the village. The water is uncomfortably hot to bathe in.

Thirteenth Day.

	Ri.	Chô.
Wada	5	18
Nagakubo	2	0

Very long pass after leaving Shimonosuwa, the Wada Tôgé. Shortly after leaving the town to the left is the Miya. A long flight of steps leads down to it. Looking back there are very pretty views of the lake and the surrounding hills. The ascent is very long and tedious, and part of it very steep. There are several tea-houses on the road. At one of these, Nishi Mechiga, there was a fight in 1864 between the Tycoon's troops and some Mito Rônins, who wished to present a petition to the Mikado as to his assuming the power. The Rônins were defeated, and took refuge in Echizen. In the winter the snow is very deep here. There is a fine view of the volcano of Asama Yama and the valley of Wada. From Wada to Nagakubo is a gradual descent. The hills on each side of the valley are covered with trees.

Fourteenth Day.

	Ri.	Chô.
Ashida	1	8
Mochidzuki	1	8
Yamata	1	0
Shiwonada	0	27
Iwamurata	1	12
Odai	1	7
Oiwaké	1	8

Steep descent after leaving Nagakubo, the Kasatoritôgé, or "take-your-hat-off pass," in honour of Asama Yama, of which mountain one has a glorious view from the summit. Here is a tea-house, very well situated, where they show you a stone which appears to be much prized. It is rectangular in shape, almost black, and on one face of it, in light coloured stone, are the supposed representations of the sun, moon, and stars. Asama Yama was enveloped in the puffs of smoke which issue now and then from the crater, and it was mid-day before there was wind enough to dispel them. The road from the Kasatoritôgé to Oiwaké is uninteresting; it crosses a large river, the Chikumagawa, which runs into the sea at Niigata, but with the exception of the last stage it goes through paddy fields. Oiwaké is on the spur of Asama Yama, about a quarter of the

way up, I should think. It was quite cold here at night, and in the morning the village was enveloped in clouds. The last great eruption of Asama Yama was, I was told, about forty years ago. Oiwaké is a busy, picturesque place, consisting, like most of the towns on the Nakasendô, of one long street. A road leads hence to the seaport of Niigata, and another to Kuzasu, 18 ri off, which is a favourite watering-place.

Fifteenth Day.

	Ri.	Chô.
Kutsukake	1	3
Karuizawa	1	16
Sakamoto	3	0
Matsuida	2	18
Annaka	2	16

Road perfectly level for the two first stages; crosses the plain to mountains opposite Asama Yama. Karuizawa is at the foot of these, and here formerly was a barrier. Immediately after leaving Karuizawa the road ascends the Usuitôgé, the death-place, in ancient days, it is said, of the wife of Yemato-dake-no-Mikoto, who had subdued the barbarous inhabitants of the region, and when he returned to Kiôto he named the country Adzuma, or Waga-tsuma (my wife). Adzuma also means the country east of Kiôto or Kuantô. The ascent of the Usuitôgé is steep, but not long. At the top is a tea-house and a delightful old Miya or Shinto shrine, to which you ascend by a long flight of steps. Here I bought some curious sheets of paper, called Kumano Gôô, with crows and hearts lithographed on them, the use of which is in taking of oaths. The priest told us that if a man forswore himself after swallowing one of these crows or hearts he was certain to fall down dead. There is a very fine view from the summit of the Usuitôgé. On one side the Asama Yama and the mountains of Shinshiu in the distance, and on the other you look down on wooded hills; beyond these huge rocks, and then the plain which extends to the Bay of Yedo. The descent to Sakamoto is very long, and the last part of it very steep. In one place there were large stones supported by wooden props, the idea being to close the road by removing the props. After Sakamoto you descend the whole way to Annaka, following the valley of the Usuigawa. The villages here are large and prosperous-looking; the people all occupied in reeling silk. For a couple of miles before reaching Annaka the road is lined with magnificent *Cryptomeria*. Annaka is a large place overlooking the Usuigawa.

Sixteenth Day.

	Ri.	Chô.
Itahana	1	0
Takasaki	2	0
Kuragano	1	19
Shimachi	1	18
Honjo	2	0
Fukaya	2	25

Pleasant walk from Annaka to Takasaki, along a perfectly level road. Takasaki is a large town; the only one between Kiôto and Yedo on the Nakasendô. It is a busy place, in the centre of the silk district. On the south side of the town is a large castle, apparently in good preservation. We found signs of Western civilization here, which we had not seen since leaving Kiôto, viz., a shop with beer and wine. The road from here to Yedo is perfectly flat, and a coach has lately been organised to run between the two towns on alternate days, the distance being about 70 miles. This neighbourhood is famous for its silk, that of Shimamura, near Fukaya, being considered the best. Just before reaching the latter place you pass a sort of fortress, the habitation of a Hatamoto under the Tycoons. Near it is the Temple of Fusaiji.

Seventeenth Day.

	Ri.	Chô.
Kumagoe	2	27
Konosu	4	8
Okégawa	2	0
Agéo	1	0
Omiya	2	0

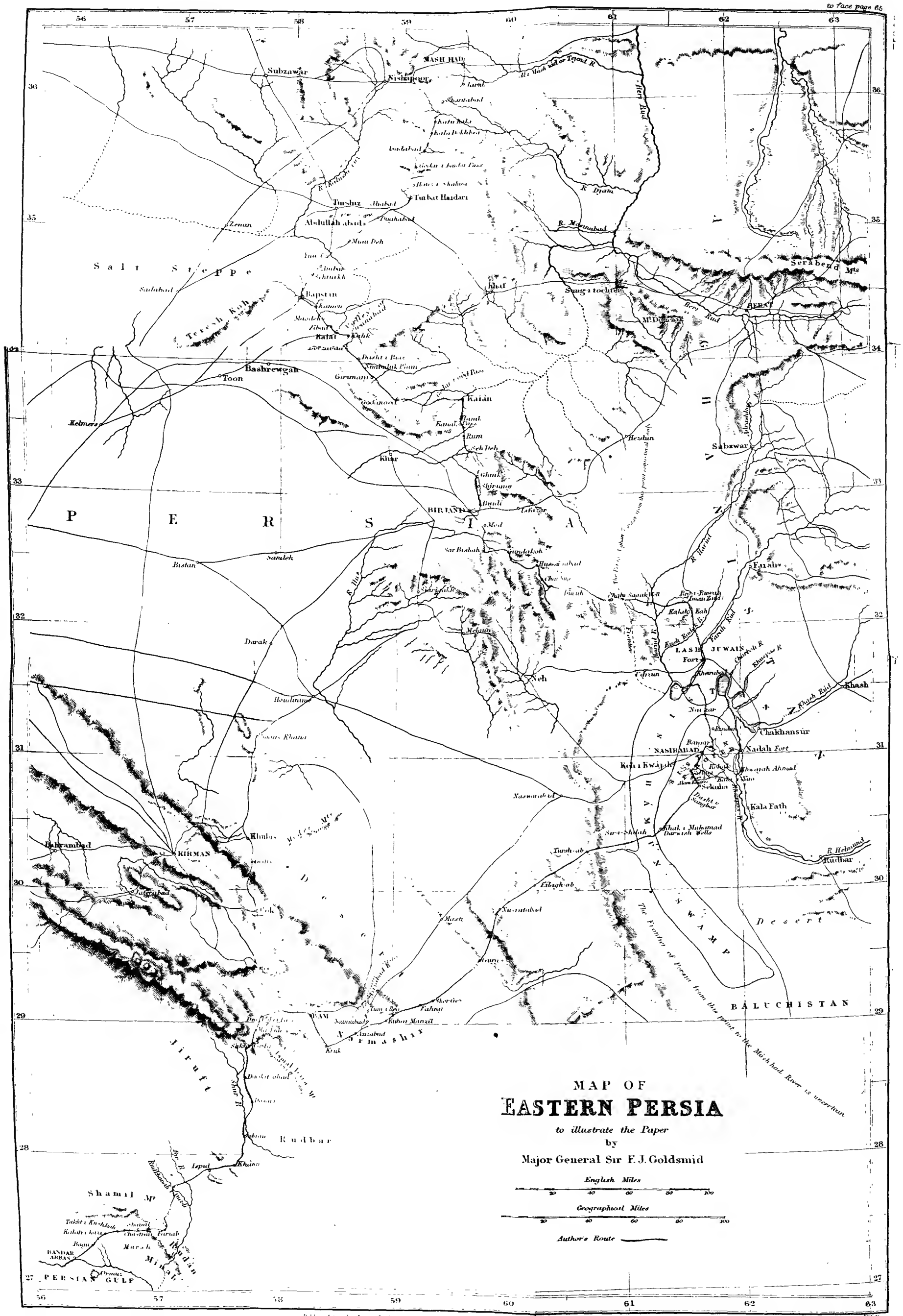
We had now got far down into the plain; the heat was very great; mosquitoes abounded, and the road was flat and uninteresting.

Near Omiya is the Shintô shrine called Hikawa-no-Jinga, where the Mikado worships once a year.

Eighteenth Day.

	Ri.	Chô.
Urawa	1	10
Warabi	1	14
Itabashi	2	8
Yedo	2	8

There is nothing of interest between Omiya and Yedo. Near Warabi the road crosses the Todagawa, which runs through Yedo with the name of the Sumidagawa. The whole distance from Kiôto to Yedo by the Nakasendô is 136 ri, or about 340 miles. By the Tôkaidô it is 10 ri less, and the journey


MAP OF
EASTERN PERSIA
to illustrate the Paper
by
Major General Sir F. J. Goldsmid
English Miles
Geographical Miles
Author's Route
PERSIA
Salt Steppe
Desert
SWAMP
BALUCHISTAN
Kudbar
Shamil Mt
PERSIAN GULF
BANDAR ABBAS
KIRMAN
BIRJAND
MASHHAD
Subzawar
Nishapur
Turbat Haidari
Abdullah abad
Bajistan
Kalat
Bashrewgan
Toon
Kelmers
Kaian
Khar
Bistan
Sandeh
Darak
Bahrambad
Jiruft
Sabzwar
Faraha
Khash
Chakhansur
Nadah Fort
Kala Fath
Rudbar
BERAT
Serabend Mts
Sang i tochen
Khaf
Tun
Neh
Nasirabad
Kuh i Kwajah
Nasratabad
Fahraj
Kuhan Manzil
Kruk
Lepid
Khamir
Bam
Narmashir
Kerman
Khabis
Jaziabad
Dashtabad
Tarsh ab
Filugh ab
Sar i Shilah
Khak i Muhamad Darwish Wells
Sekuha
Nasratabad
Masta
Bamm
Shor Gez
Tum i Rez
Sawabad
Azizabad
Dashtabad
Sabzwar
Khabis
Jaziabad
Tak
Takht i Kushk
Kohdar kuh
Bam
Chastrab
Faraah
Marsh
Mirab
Rudbar
Ormuz
Lepid
Khamir
Rudkhanah
Kuh i Kwajah
Nasratabad
Tun
Fahraj
Kuhan Manzil
Kruk

took us twelve days instead of eighteen. With the exception of the scenery near Fuji, the scenery on it cannot be compared to that on the Nakasendô. It runs the greater part of the way through a comparatively level country, sometimes quite close to, and never far from, the sea, but through much more populous and richer districts than the Nakasendô.

IV. *Journey from Bandar Abbas to Mash-had by Sistan, with some Account of the last-named Province.* By Major-General Sir F. J. GOLDSMID, K.C.S.I., C.B.

[*Read*, January 27th, 1873.]

ON the 21st December 1871, accompanied by Major Bean Smith and Mr. Gerard Thomas, I landed at Bandar Abbas, with the intention of proceeding to Sistan, to carry into effect the Boundary Settlement, with which I had been entrusted. We found Mr. Apothecary Rozario in waiting for us, and our Persian Jiludar, or head-groom, had brought us down three horses from a stud we had left the previous year at Bam, in Persia. In two days after disembarkation our full preparations had been made, and the day before Christmas Eve we left Bandar Abbas for the interior. Whatever the merits of this port in a commercial point of view, it is no more a Capua for the European traveller of the present day than was the Gambroon of Shah Abbas to the Shirleys, or to Mr. Bartholomew Plaisted when he visited it some 120 years ago. To those Europeans who must needs reside there, the hulk of the British-India Steam Agency gives perhaps the best accommodation.

We accomplished the march to Bam in sixteen days, inclusive of four halts.

For the first 50 miles we passed along and from the sea-coast, in a direction somewhat east of north-east, through a plain country intersected by streams from the neighbouring mountains, very sparsely populated, and containing widely separated patches of wheat or barley cultivation, here and there a field of thriving henna, with occasional date groves. "Kálah-i-kázi" (the Kazi's Fort) and a village named "Takht-i-kushkoh" formed exceptions to the general rule of solitariness; but on entering the first of the rocky ranges which crossed our path, and until emerging on the open plains through which runs the river known as the "Rudkhanah-i-Duzdi" (the river of robbery), or for nearly 40 miles to the north-east, the inexperienced traveller might well imagine he had found a land wholly

depopulated. He would see date palms, it is true, before attaining the river bed, but hardly of a character to give life to the picture. The usual vegetation observed, was that of the Persian and Baluchistan deserts, the more prominent features being the thorn, tamarisk, or jujube tree, the deleterious oleander, and the healthier fodder-providing shrubs or grasses. We encamped on the left bank of the Rudkhanah we had reached, which, rising from natural springs, here runs from west to east, subsequently turning to the south to change its name at Minab, and thence pass under its new designation to the sea. At this halt we had expected to meet our "Mihmandar" (caterer), deputed by the Governor of Kirman to attend us; but Jafir Khan, the headman of the district, stated he had gone on to Khànu, a village distant between 30 or 40 miles, and was there awaiting us. After a day's halt we proceeded across a fine plain, passing at one time through abrupt rocks, to the spot indicated, dividing our march into two stages. At Khànu, a fort-crowned village and headquarters of the Rudbar district, we were met by a considerable cavalcade, headed by Chiragh Khan, brother of the old Chief Nur-u-Din, receiving a visit from the latter almost immediately on arrival. No "Mihmandar" was here, as reported. It was now said he had taken another road, so, halting on New Year's Day, we moved on the 2nd January two marches in a N.N.-easterly direction to Dosari, the residence of another petty chief, Jahángir Khan. This person sent his son to meet us with a retinue, much as we had been honoured with at Khànu; but he could give us no tidings of our "Mihmandar." From Dosari it became a question which of two passes we should choose to cross the high snowy range of mountains before us. That more generally known, lying to the westward, the "Deh-Bakri," had been traversed by Major Murdoch Smith, R.E., in 1860, and his account of it determined me to select it for our present journey. That to the eastward, or "Zornat," was pronounced the better suited for camels, as it was comparatively low and easy, and snow was thick on "Deh-Bakri." Further inquiry and deliberation at Dosari, caused me to adhere to the original intention, and we accordingly marched out from that place 17 miles to the north-west, encamping at a cluster of huts, designated "Daolat-abad," on the plain of Jiruft, a district contiguous to that of Rudbar. Here at length we were joined by the "Mihmandar," who brought a friendly letter from the Kirman Governor. The man had been, it appeared, nearly two months away from Kirman in quest of my camp.

From Daolat-abad we made a long march of 30 miles into the mountains, ascending at one time to a height of some

5,400 feet at the "Sakht-dar" pass, and halting only at about two miles short of the higher one of "Deh-Bakri," estimated at 7,800. Rain and snow, the straying of mules, and delays in the progress of camels, want of fodder, absence of villages and population, these or like causes compelled us to stay at a miserable caravanseri near the summit of the last and loftiest ridge for a whole day after reaching it. But on the day following we effected the passage, and by a second forced march of 35 miles completed our descent, and traversed the plain country to Bam, near which place we were met by Major Lovett, R.E., Quartermaster-Sergeant Bower, R.E., and one or two of our old native attendants.

My impression of the people in the tracts we had passed through, was, that they were for the most part a poor, inoffensive race, thoroughly under the control of their immediate chiefs. In Rudbar, I understand that Nur-u-Din has authority over 2000 houses of ordinary peasantry and 1000 houses of slaves. Both he and his fellow-lairds at Dosari and Rudkhanah-i-Duzdi are men of influence, and the two former advanced in years; but judging from appearances and hearsay, the Dosari man is the most respectable of the three; Nur-u-Din's brother Chiragh Khan is an open and unmistakable drunkard; of Nur-u-Din himself I have not the same conclusive evidence, but report is decidedly against him. Jafir Khan did not scruple to beg for brandy. I have no reason, on the other hand, to doubt the assertion that Jahangir Khan is a man of opposite tastes and propensities. In some parts I noticed the villagers to have countenances of a semi-Arab or Oman type, showing a mixture of Slave and Sidi, with lean and squalid exterior. The children were sickly in aspect, the women almost repulsive. Our treatment by all grades was, as a rule, excellent, and my experience of the 250 miles traversed leads me to the conclusion that any Persian-speaking Englishman, possessed of tact and principle, if only armed with a letter from, or to, the Governor of Kirman, or other local authority, might spend a pleasant winter month in the fine Rudbar and Jiruft districts, shooting or exploring with comfort and safety. The black partridge abounds in the lower plains, the grey partridge in the mountain country.

We remained at Bam four whole days. It was my third visit to this place, of which I have already submitted a short account to the Royal Geographical Society. Only on the first occasion, however, and when I was little more than a traveller without retinue, did I obtain admittance to the fort, and that through the personal kindness of the former Governor of Kirman. As a rule strangers are not allowed to enter, and the rule applied

to the officers of my staff as to others. From Bam we marched, on the morning of the 12th January last year, to the village of Kruk, or 23 miles in a S.S.E. direction, and towards the line of mountains we had crossed at Deh-Bakri. This chain appears to have no generic name of its own, but is distinguished by the names of its more prominent points. Here, for instance, it would be called Dosari, from the village of that name on the south side, or better identified perhaps as "Jamálbára," from a high range so designated, and clearly a corruption from the Arabic "Jabal-el-bárid," the cold mountain. From Kruk we turned E.N.E. to Azizabad, 17 miles, making a distance of 40 miles from Bam, when we could have marched directly upon it, as I did in 1866 and 1871, in 28 miles. The reason of the *détour* was, however, one which, under the circumstances, I did not see cause to sitt closely, and we had, as it was, to stay four days at Azizabad to prepare for the march across the eastern skirt of the Kirman desert.

Leaving Azizabad on the 17th January, we marched 18 miles E. by N. to Kuhar Manzil, and on the day following shifted our camp 4 miles E.N.E. to Tum-i-reg. From Bam to Náimabad, a village passed between Azizabad and Kuhar Manzil, our road ran through the plain country and among the more fertile parts of the Narmashir district. The rich cultivation I had noticed in former journeys was this year equally remarkable, and the walled farms and hamlets, found at short distances amidst watercourses and green fields, gave unerring signs of rural prosperity in Persia proper. The climate, moreover, was delightful, bracing without severity. From Náimabad, in a northerly direction, cultivation generally ceases, even the low but grateful tamarisk jungle fails, and when the town or large village of Fahraj is left behind, the desert may be said to begin. Fahraj possesses a fort in good preservation, is comparatively populous, though the reported 2000 is perhaps excessive, and boasts a good site on the Azizabad River, here 200 feet wide and full of a grass called "Diranch."

From Fahraj to Sekuha in Sistan is from 225 to 230 miles. Our camp at Tum-i-reg was pitched just 11 miles on the road. From that point our marches were—Shor Gez, 22 miles E.N.E.; Gurg, 35 miles N.E., and Nusratabad, 37 miles. Here we were compelled to halt for five days, awaiting a body of Sistan Baluchis despatched to meet us. We had pushed rapidly across the intervening desert, and were entering the mountain ranges S.W. of Sistan, dividing by a continuous line to the eastward that province from the outlying Persian and Perso-Baluch districts annexed in recent years to Kirman. The last hundred miles traversed had been, for about two-thirds of the way, over

a sometimes hard, sometimes sandy desert plain of vast extent, marked by occasional ruins or predesigned landmarks. At 9 miles from Tum-i-reg is a strong tower of kiln-burnt bricks, between 50 and 60 feet high, said to have been constructed by Nadir Shah. From the summit, reached by a spiral staircase, a view of the surrounding country may be obtained, but the panorama is not recommended by variety. Between Shor Gez and Gurg is another tower, in ruins, and a very old Rabát or caravanseri. The fort of Gurg, situated in a salt marsh near our encamping ground, was held, it is believed, by the Gurgi Baluchis, who inhabited these parts, until driven out by their fellows at Chága and Kharan. A maranding party, supposed to be from Chága, had defeated a Persian detachment under the Governor of Bampur in that very neighbourhood not many months, or perhaps weeks, before our coming there. Between Gurg and Nusratrabad we passed through a low mountain range, the greater part of the way along a narrow pass, whence we emerged by a "Darwázah," or gate, of which the artificial finish is attributed to Nadir. From this defile, Nusratrabad was discovered in the low country, in the form of two brown castellated buildings, which on approach proved to be the old and new stations respectively, each a walled enclosure for the protection and location of armed men or peaceful cultivators, as the case might require.

From Nusratrabad we marched to Kilagh Ab, 23 miles, first through rocks to the N.E., passing among them, easily and with gradual gentle rise, to the outlet and watershed about 11½ miles; then traversing a plain covered with tamarisk, shrubs, and grasses, and low unconnected hills. Much granite of a bluish grey colour was observed. Our general direction was N.E. by E. During the nights rain came down so heavily that the road became impracticable for camels, and a day's halt was inevitable. We attempted to take advantage of the occasion, and explore on foot a reported Tower of Silence or Parsi burial-place on the summit of an adjacent rock, but had to return disappointed owing to the distance.

The next day we accomplished a bitter cold march of 30 miles N.E. by E., through hills and rocks, encamping at wells in the bed of a stream near Turshab. We had now entered a wild mountainous region, and some of the peaks were of great height and covered with snow. After passing the watershed our actual marching road was tolerably level. To those unaccustomed to Persian servants, a dinner and a bed, according to the civilised acceptation of the terms, would have appeared chimerical for travellers cutting their own firewood and lighting their own fires in the bed of a Baluch mountain torrent; but, though such

was to a great extent our situations, we were able to have and appreciate both. Hence we pushed on in a general E.N.E. direction for 35 miles, *i.e.* 10 miles to the passage leading out of the hilly country, 1 mile further to a low range, and 10 more to the plains of Sistan, unmistakably distinguished from the stony slope by which it is reached from the S.W. Another 6 miles brought us to the "Shilah," or dry bed of a canal, and only three remained to reach the resting-place for the night. But our tents could not keep pace with us, and, moreover, went astray; so we bivouacked in the open air, drawing our cots as near to the central wood fire as convenient. On the following day, rejoining our camp among some scattered tamarisk bushes, after a four miles' march over dry whitish soil, we halted at the wells of Khak-i-Muhamad Darwesh to get all hands together, and on the 1st February made a 30-mile march to Sekuha, the more modern capital of Sistan. Our route was for the most part across low inundated lands as before, and we passed many tumuli and ruins. At about 7 miles before reaching our encamping ground we rose to the Dasht-i-Sangbar, a tract which appeared in the distance like a range of pale cliffs of considerable extent, and finally we found Sekuha itself amid utter desolation, across a country so rugged and cut up, as though it had been purposely rendered roadless and difficult of transit.

SISTAN.

It would be somewhat embarrassing to define what at the present day is meant by the term "Sistan." Intelligibly to illustrate the case I see no better plan than to suppose two territories, one compact and concentrated, which I will call "Sistan Proper," the other detached and irregular, which may be known as "Outer Sistan."

I. SISTAN PROPER.

This district is bounded on the north by the "Náïzár," or reed bed which fringes the "Hámún," or expanse; west by the Hámún itself, of which the hill called "Koh-i-Kwájah" marks the centre of the line; south by a line comprising Sekuha and all villages and lands watered by the main Sistan canal; and east by the old bed of the Helmand, from a mile or so above the "Band" at Kohak to the mouth.

The more northerly inhabited villages may be considered "Kalah-i-Nao" and "Rindán."

The western side is marked sufficiently by the "Koh-i-Khwájah."

The southern line should comprise Burj-i-Alam Khan as well as Sekuha.

The eastern line may be designated by the villages of Khwájah Ahmad and Jahánabád, both on the left bank, or west of the true bed, of the Helmand.

The area is estimated at 947 square miles. The fixed population of Sistan Proper may be roughly stated at 35,000. To this may be added a nomadic population of 10,000. In classifying the first, I have been disposed to consider one-third as Persians, Baluchis, Afghans, and the other non-aborigines; and the remaining two-thirds to be Sistanis. But the statement of the Amir of Káian that 20,000 Persians had come recently into the country owing to famine and other causes, while held far from admissible in its entirety, leads me to modify the proportions to two-fifths and three-fifths. Therefore of 35,000 it may be said that 20,000 are Sistanis and 15,000 settlers, the greater part of whom are Parsiwáns. I use this term in a general rather than specific sense to indicate a Persian-speaking people. Indeed with few, if any, exceptions, all the true inhabitants of Sistan speak the Persian language. The nomads are simply Baluchis.

Taking the aggregate at 45,000, and looking at the extent of country comprehended, there would be found nearly 48 persons to the square mile.

These figures are not dissimilar to those of certain European counties or cantons,* and are eight times in excess of the proportional result found for the whole of Persia.

Sistan Proper is a considerable tract of sand and clay alluvium, generally flat, but irregular in detail. It has heaps, but no hills; bushes, but no trees, unless indeed three or four tamarisks of aspiring height deserve the name; many old ruins and vestiges of comparative civilisation, but few monuments or relics of antiquity. It is well watered by rivers and canals, and its soil is of proved fertility. Wheat or barley is perhaps the staple cultivation; but peas, beans, oil seeds, and cotton are also grown. Among fruits, grapes and mulberries are rare, but melons and water melons, especially the latter, are abundant. Grazing and fodder are not wanting, and besides the reeds peculiar to Sistan, there are two grasses which merit notice, that called "bannú," with which the bed of the Hámún abounds on the south, and the taller and less salt "kirta" on the higher ground.

The expanse termed the Hámún, which stretches far and wide on the north, west, and south of Sistan Proper, is for the most

* Kircudbrightshire, for instance, 1861: area, 954 sq. miles; population 42,495.

part dry, and the existence of a lake can only be certified at the present day, at least in the early spring, by pools or hollows of water formed at the mouths of the principal feeders, such as the Khashrúd on the north-east, the Farah Rud on the north-west, and the Helmand, where its old bed terminates at no great distance from the Khashrúd. The Harud and Khuspas were both dry in the middle of March last. We crossed moreover a perfectly dry, though grass-covered, level on entering Sistan from the south-west, and an equally dry space on passing from the province into Lash Juwain on the north. Yet the edge of the Hámún is tolerably defined on both these sides, first by the "Náizár," or reeds to the north, and secondly by a clay cliff of irregular height called the Sangbar to the south.

The comparatively small area here described is termed Sistan Proper by no capricious or arbitrary nomenclature. In adopting the definition I have been guided by local practice and evidence. When at Imam Khan's residence, on the right bank of the Helmand, I was informed that at a time of scarcity they were provided with grain from "Sistan." When approaching Sekuha from the south, and within the latitude of the supposed Zirah Lake, an old confidential Sistani in our service expressed much annoyance, that, owing to negligence or ignorance, our guides had missed the short track "leading into Sistan." The banks of the Helmand above Kohak may well be considered to involve a separate report both in a geographical and political sense, and so also Chakhansúr on the north-east.

The water supply of Sistan is perhaps as uncertain as that of Sind, though the general inclination to one bank, the left, is more marked in the Helmand than in the Indus. The soil of the two countries has much of the same character, and Sehwan, with its rich corn-fields, might be found as like Sistan in fertility as connected with it in etymology. Under these circumstances even the boundary lines which we have sketched must be received with slight reservation. It is easy to see that a good year of inundation extends the borders of the so-called lake to within the Náizár; and there are well-defined beds of dry canals intersecting the country, which prove the existence erewhile of an extensive water system no longer prevailing.

The main canal of Sistan, confounded by some writers with the parent river, bears the waters of the Helmand westward into the heart of the country. They are diverted by means of a large "band" or dam, known as the "Amir's," the "Sistan," or the "Kohak" band indifferently. It is constructed of horizontally thrown tamarisk branches, earth, and perpendicular stakes, and protected from damage by a fort on the left and a tower on the right bank of the river. Although this diversion

of the stream may be an artificial development of a natural cause, and undoubtedly dates from a period long prior to recent Persian occupation, it appears that the late arrangements have been more maturely and better organised than those carried on by the predecessors of the Amir of Káian. The towns of Deshtak, Chelling, Burj-i-Alam Khan, Bahramabad, Kimmak, and others of less note are actually on the banks of this main canal. But it is, moreover, the indirect means of supplying water to almost every town and village in Sistan Proper. For from it proceed minor canals, which carry its waters north and south, and by these, in their ordinary course and occasional inundations, a system of profuse irrigation is put in force, which, with an industrious and a contented population, should be productive of most extensive grain cultivation. To consider the main canal here described as the river itself, is a theory which a brief inspection of the locality seems quite to disprove. On the one hand we have a comparatively narrow passage abruptly turning to the westward; on the other, a broad and well-defined river-bed prolonged in the old direction, into which the waters would at all times flow unrestrained but for an artificial embankment. Whatever arguments, however, be used on this head, I feel warranted in assuming the larger bed to be the original Helmand for purposes of territorial limitation.

Experience of the climate from the end of January to the middle of March enables me to report an extraordinary range of thermometer, the fluid rising from 5° above zero to a maximum of 93°. Cold was the prevailing characteristic; severe heat more exceptional than severe cold. The winds were often strong and continuous, usually cool, and sometimes sharp and piercing. Snow fell on the 5th of February, but we were informed that this circumstance, as well as the general severity of the winter, was rare.

Provisions we found, as a rule, sufficient; sheep somewhat poor, and oxen indifferent. Bread was cheap and good, being procurable to natives at less than a halfpenny the pound. Vegetables were scarce, and rice was chiefly obtained from Herat. The inundated lands were alive with water-fowl. Partridges and sand grouse were occasionally seen. River fish were plentiful enough, but confined to one species, the barbel.

II. Outer Sistan.

The country on the right bank of the Helmand, and to the eastward of its *embouchure* in the Hámún, extends to a distance of 120 miles in length, or from a point between the Charboli and Khuspas rivers north, to Rudbar south. In breadth the

district of Chakhansúr, measuring from the old bed of the Helmand, inclusive of Nad Ali, to Kadah, may be estimated at some 30 miles. It produces wheat and barley, melons, and perhaps a few vegetables and oil seeds. Beyond the Chakhansúr limits, southward or up to the Helmand, I can suppose no cultivation except that obtained on the river bank, and ordinarily illustrated by patches of wheat and barley with melon beds.

On the opposite side of the river, in addition to the cultivated portions of the bank, there is a large tract extending from above Kohak, or the Sistan Band, to the gravelly soil below the mountain ranges which separate Sistan from Baluchistan and Narmashir. The distance from north to south of this plain may be computed at 40 miles, and from east to west at 80 or 90 miles.

There is a fort in which the Sardar resides, and there are about 150 houses outside, bearing the name of Chakhansúr. I cannot ascertain that there are any other towns or villages in the district so designated, excepting Kadah on the eastern limit. The population consists of Sistanis or Parsiwans, of Baluch nomads and Afghans, but I have no sufficient data to speak confidently as to numbers. Major Lovett, who roughly surveyed the locality, was unable to trace the "Sheikh Nassoor" of Ferrier, which was probably intended for "Chakhansúr," though two places and two names are recorded in the quartermaster-general's map. The lake formed by the waters of the Khash and Helmand rivers he described as a "wide expanse of water with patches of reeds growing in the midst." Between the "Band" and Rudbar the fixed inhabitants are Baluchis, of whom there are naturally many nomads also. The tribes are chiefly Sanjarani and Toki, the Sardars jealously claiming to themselves the former appellation.

From Banjar in Sistan, where our camp had been pitched for many days, we moved in a northerly course to the Afghan district of Lash Juwain, crossing a dry and for the most part barren tract, scant of villages and population, but interesting in unmistakable evidences of bygone prosperity. Our approach to the ideal Sistan Lake in this direction was through miles of far-spreading stunted reeds, the smoke of which, when burning, presented but a mild contrast to the yellow guise of their quiescent state. Beyond the broad fringe, the land was waste and waterless.

The district of Lash Juwain, or Hokat, has been described by Ferrier and Conolly. It is of no great extent, and apparently little populated and sparsely cultivated. There are said to be

but five villages in it which are really of any account in the question of revenue. The fort of Lash stands on a high perpendicular cliff about 400 feet in height, overlooking the Farah River. The buildings, which Conolly not unnaturally thought so insecure that many would fall down the precipice in the twelve months succeeding his visit, are, I understand, those that we now find there nearly thirty-three years afterwards. The word Lash, as stated by Conolly, means a cliff in Pashtu. As for Juwain, I think it probably a contraction from "Jui nao," the new stream, a name actually belonging to our encamping ground immediately under and opposite to the fort of Lash.

Crossing the Farah Rùd we moved in a northerly direction along its right bank for a distance of some 35 miles, over a country for the most part blank and desolate to Kalah-i-Kah, where one or two village forts and outskirts showed signs of life and means of subsistence. From this point we struck off in a westerly direction, reaching the Harùd or Harùt Rud, which marks the frontier of Persia, now perfectly dry, and there encamped. During the march, Sardar Ahmad Khan took leave, and I shall always pleasantly remember his courtesy and attention to us while in his territory. He is a man of quiet, undemonstrative manner, but of quick, intelligent eye and expression. Of Conolly he speaks as of a friend, and I believe with true regard; of Khanikoff his mention is less unconstrained, but I have little doubt he has benefited in address and demeanour by intercourse with both travellers. The Sardar has three sons, the eldest of whom, Shamsudin Khan, has been to Kabul, and was present at the Ambala Durbar in 1869; of the two younger, one, a handsome boy, wore like Shamsudin, European costume. We also made the acquaintance of Muhammad Husain, the Sardar's uncle, whom Conolly mentions in 1839 as a favourite child of Shah Pasand Khan, grandfather of the present chief. Ahmad Khan's brother, Samad Khan, is Governor of Juwain. The road from Lash Juwain to Birjand, at first over a dreary plain or undulating tract, becomes less barren and more mountainous on approaching the large village of Duruh. The only mention I can find of this section of country by former travellers is in a bare record of the names and distances of five stages, which form part of a long route given by Kinnier from Kandahar to Bushahr, with a remark to the name Duruh, "through a barren country called the Desert of Despair." From Duruh to the flourishing village of Husainábád, the older town of Sar-Bishah, the old fort and modern village of Mod, and the capital town of Birjand, there are mountains and plains at intervals with much wild vegetation, and cultivation where there are inhabitants. The general

direction of the hills appears to be N.W. and S.E., with plains or valleys called "Julgah" of more or less extent, and in many cases shut in like an amphitheatre. Birjand is well situated at the foot of hills, and there are rather high mountains to the westward. It has for many years been the principal city of the "Káianāt," or divisions of the large Káian district, of which there are nine and a half "Buluks" or departments, so superseding Káian, the original headquarters. The houses are much in the style of the ordinary Persian dwellings, from two to four mud domes marking the residence of one family; but there are signs of modern and more civilised architecture, which I understand to represent a new bazaar in course of completion, and attention seemed to be given here to the width and regularity of a public thoroughfare. There are said to be some 2500 houses in Birjand, but I doubt that in such assumption the census would show as many as five inhabitants to each house. We were received by a cavalcade, headed by a small boy, a son of the Amir of Káian, sent out on a plea of ill-health of his eldest brother, governor of the town during his father's absence in Sistan. The next morning, however, the invalid himself called upon me, and I returned his call in the "Ark" or citadel the day following. We were detained three days in Birjand for camels. Promises were made and broken as usual.

We marched through a mountainous country and almost due north to Káian, the town which gives its name to the district, but were five days in accomplishing this distance, only 67 miles, having made four marches instead of three, and halted the second day. We left Birjand on the 1st and reached Káian the 6th of April. The intervening stages were Ghiuk, Seh-Deh, and Rum. I mention them especially, because I know of no European traveller who has heretofore visited one or the other, and they are not in any map that I have seen. The first is the most picturesque and has the essential character of mountain scenery. It is situated at the eastern extremity of a basin rather than valley of highland, over which peer the crests of majestic mountains in the tracts north of Birjand, where the altitude, unless our barometers greatly misled us, is not far from 8000 feet above the level of the sea. The village, crowned by a dilapidated fort of stones and mud, consists of some hundred houses; but for these the occupants are said to be 120 only, about 150 having died or deserted during the recent famine. Near it are many fruit trees and gardens, and extending down the valley in narrow strips or literally steps, are beds of green cultivation. The effect is good, although the colour is monotonous. Even the green presents no strong contrast, but blends, as it were, with the sober drab and earthy tints of the

prevailing *entourage.* A stream of water runs in a westerly direction down the valley, which is itself confined by the surrounding hills to a narrow space trending rather from E.N.E. to N.N.W. than due westward. There are many basins or valleys near the encampment, like this one, possessing fruit trees, water, and cultivation, but without the presiding village. Many of the high mountain tops are clothed in reddish or greenish hues, and the flatness of the incline is relieved by dark boulders. Vegetation is profuse and varied, and it is pleasant to know the pale green colour, discerned apart from cultivation, to be produced by a fine coating of grass instead of a mineral presence. Descending to a broad high plain, we found Seh-Deh a tolerably large village, but many families were said to have emigrated thence owing to last year's famine. We were shown some beautiful specimens of the carpets for which the district is famous—they are chiefly made at a place called Darakhsh. Rum is a small village at the foot of hills, with domed mud hovels, a fort of sun-dried brick and some protective stone walls. The population, now reckoned at from thirty to forty families, is reported to represent less than half the number it contained two years ago.

Káian, the ancient capital of the district, once overrun by Uzbeks, later by Arabs, is a place of much local note, and has a history of its own. It covers a considerable extent of ground, and has large and numerous walled gardens. These stretch out here and there like those of Kashan, and other centres of population in Persia; but when approached they seem to want the life and freshness their office implies. With all the space covered by walls and buildings the population is limited by some to 500 houses in the sense of families. I think there must be more, though nothing like the 4000 houses and 10,000 inhabitants stated by one of my informants. The town is built upon a plain almost surrounded by hills and mountains. In the neighbourhood is obtained fruit of many kinds, wheat, barley, and saffron. A great amount of raw silk is exported, and some little reserved for home manufacture. The inhabitants of Káian, much as those of certain villages in the district, are chiefly Saiads, Mullahs, and the like, men with all the elements and training of bigotry and intolerance, and with perhaps less regard for authority than any other class. From our short experience of Káian, I should infer that the place was ruled in the secular as in the religious sense, and acknowledged no resident temporal power out of their community. Our camp was crowded with white, green, and blue turbans, marking the several degrees of learning or sanctity of the wearers, whose staring and inquisitiveness with regard to ourselves it took some trouble to restrain;

at the same time I must record a complimentary visit from several of their number, among whom two or three showed respectably in address and intelligence. According to these persons we were the first Europeans that had been seen at Káian, and it is almost to be hoped that such is the case, when we find so important a town marked in our best maps about 60 miles south, instead of the same distance north, of Birjand.

We had heard much of the Turkoman, or as they are here called Alaman, raids on the district we were traversing, and the common report that these robbers were about, together with the appearance in our camp of one or two recent sufferers at their hands, suggested the adoption of a route slightly different from that by which, under original agreement, we were to have moved towards Mash-had. No mounted escort was procurable at Káian, nor had any been given to us at Birjand. We were told that there were no horses whatever for mounted guards, all available cavalry being in Sistan, and the scarcity of grain and fodder having lately reached its climax. Our escort consisted of footmen only, hastily got together from stage to stage, and armed with matchlocks of primitive construction. Independently of these we trusted to ourselves and attendants; but it was held advisable to march as much as possible in company with the baggage, so as to concentrate our forces and protect our property. I have mentioned that the mountain chains ran much in a N.W. to S.E. direction, and the "julgahs" or valleys between would naturally lie in similar lines, varying however greatly in length and breadth, the first being limited by cross ranges. Between Káian and Bajistan, whither we were forced by circumstances, lay the two large "julgahs" of Nimbuluk and Gunabad. Instead of traversing the first and skirting the second as before intended, or traversing as much of one or both as would secure a tolerably straight line to Mash-had (a better route than all, had Bajistan been discarded and were there no Turkomans and sufficient supplies), we were asked to skirt the two plains, that is, to keep the hills on the southern side of each, passing from one to the other in an oblique line. The theory in these parts appears to be that the Turkoman never makes his attack singly or on foot; that he is always one of a mounted body ready to "chapao" or pounce upon the prey at full speed; that to carry out his object he avoids mountainous or difficult country, and mainly seeks the open plain or valley; consequently that it behoves the ordinary caravan or traveller, insufficiently provided to meet the enemy, to choose a détour amid the hills, in preference to risking an unequal encounter in the level country. Ignorant of the localities to be passed through, and quite in the hands of our guides, we made a sort of compromise

between a roundabout road, reported thoroughly safe, and a direct one, reported fraught with danger; and this arrangement took us on our way with a change of one station only from the original programme, and little, if any, loss in respect of time and distance. Constant rumours of the approach of Turkoman bodies, in numbers ranging between forty and one thousand, reached us; but our progress was unmolested by any.

Of the four stages passed between Káian and Bajistan, a journey of 80 miles in the aggregate, not one but offered some attraction in point of scenery, and the climate was almost perfect. The villages of Girimanj and Dasht-i-Biaz, on the sloping ground at the south-western and western extremities of the fine and extensive Nimbuluk plain, are pleasantly situated, and the last may still be considered a flourishing place, notwithstanding the common visitation. Kakhk is a village of happy site, built on rising ground at the foot of snow-clad mountains and overlooking the valley of Gunabad, the vastness of which gives it the appearance of a desert plain. There is the shrine of Sultan Muhamad, brother of Imam Raza, conspicuous under its dome of painted tiles with fanciful designs, and evidently held in great esteem by the inhabitants. Zibad has perhaps less striking features, but we passed Kalat on our way thither, a large place on the hillside abounding in gardens and cultivation. As we turned aside from the marching road to dismount at this remarkable village, the inhabitants were observed to be in considerable alarm, leaving their homes or fields in haste, and in some cases running up the contiguous acclivity. It soon became evident that we were mistaken for Alamans, and it required some persuasion on the part of our guides to restore quiet and confidence. Kalat has a position assigned in certain maps, but it is misplaced with reference to other villages.

Leaving Zibad on the 15th April, we continued to skirt the hills among villages and cultivated lands, and after marching 15 miles entered the mountains which cross the western side of the Gunabad valley. We pursued a somewhat dreary and circuitous route among these for about 9 miles further, when we debouched upon a new valley, in which was the town of Bajistan. There we were joined by our Mihmandar of Birjand, who brought the good news that the camels, tents, and heavy baggage, from which we had been separated for thirteen days, were coming in. They had proceeded from the capital of the Káian district by a western route, avoiding the Nimbuluk and Gunabad plains, and our halts had enabled them to overtake us. Bajistan is in the Tun and Tabas district, and is explained to mean a place of "Bàj" or customs, the tradition being that the sea was once

over the Kavir, or salt desert, in its vicinity. It has some manufactures of silk and woollen cloth ("Bark"), and the specimen which I saw of the latter article struck me as superior. I was visited by the Naib, or chief local authority, and an Akhund or professor, and heard some strange legends of the place. One was that in former days whoever drank the water of a certain neighbouring spring went mad, and that Shah Abbas, having certified the fact by an experiment on his Wazir, caused the pernicious source to be blocked up and a healthful supply to be obtained elsewhere.

We halted a day at Bajistan, and thence marched to Yunsi, near an arm of the great salt desert of Khurasan. It is pretended that this place takes its name from the Prophet Jonah, who, when the sea reached so far, was thrown up there by the whale. Apart from its similarity of name, I can find no grounds for so strange a supposition; but I cannot say that I have heard it maintained beyond the limits of the district claiming the venerable association. The map, following Christie, has hitherto shown the stage to be "Oonshy"; I think, however, that Yunsi or Yunasi (if it came indeed from Yúnas) is the more correct spelling. By all accounts famine has not spared this village, and its mark is now visible in the poverty and reduced population represented. We were met on arrival by a number of inhabitants on foot, headed by a portly personage introduced to us as the Katkhuda. With the powers of a man in office, this worthy combined the accomplishments of an athlete, and ushered us into camp brandishing a pair of clubs with the facility of a practised performer. From Yunsi we made a long march of 30 miles to Abdullah-abad. There was little to break the monotony of the vast plain traversed. On first starting we crossed a bridge into the desert of Turbat; about midday we passed the village of Mian Deh, equidistant from Mash-had and Tabas, and our last five miles were through a succession of old and new villages and gardens. A letter from the Prince-Governor of Mash-had, in reply to one which I had sent on leaving Birjand, was brought to day, and apprised me of the arrangements made by His Royal Highness for our fitting reception in the city, and escort thither. The brother of the Chief of Turbat came out for some miles to meet and conduct us into camp, and a house and garden were placed at the disposal of the mission. The length of this day's march and the prospect of another as long immediately succeeding, induced us to halt on the 19th instant, on account of the heavy baggage. The next day we moved to Turbat, and found the distance 32 miles. Two separate cavalcades came out to meet us on our way to this place, the second headed by the governor himself

and forty horsemen. It was evident that orders had been received and put into execution to treat us with due honour, a proceeding which all precedent led us to expect from the Hisam-i-Sultanah.

Turbat is the principal town of a district of that name south of Mash-had, and is distinguished from a second Turbat not far to the eastward, by the affix "Háidari"; this compound meaning the grave of Háidar, one of the holy men of Muhamadan story. It enjoys a climate which, to judge from repute and our own experience, must be fine and bracing, and we had ocular demonstration of the excellence of its soil in the many gardens and corn-fields with which it is surrounded. Cotton is grown, opium cultivated, and silk obtained here; but this year owing to past droughts and scarcity, attention has almost wholly been given to the produce of grain. Haji Mirza Mahmud, the present governor, a handsome Persian somewhat under middle age, is an active energetic man, and appears to merit the confidence reposed in him by the Hisam-i-Sultanah, whose favour it is understood has raised him from the position of a household servant to that of ruler of a district, in supersedure of a Shahzadah or prince of the blood royal. These promotions and changes in Persia are, singularly enough, of everyday occurence, and however marked the social distinction between individuals while it exists, its existence at all is a continual uncertainty. In a country where opportunity is construed as fate, and where privileged domestics have the advantages of access over the nearest friends and relatives of a man in power, it is not unnatural to find even state officials supplanted by individuals who have once filled the post of valet, groom, or personal retainer of some sort. The Turbat district doubtless requires a firm and constant supervision, and its present condition contrasts favourably with Conolly's time, when Muhamad Khan, the chief, plundered merchants and travellers, and disposed of them wholesale to the Turkomans. We were very respectably housed by the Haji, and his attention to our wants was marked and unremitting.

From Turbat-i-Háidari, or Turbat Isa Khan, as it is often called, from a former chief, to Mash-had the distance is a little more than 80 miles. We accomplished this in three stages, over a mountainous road, rising to a pass, during the first march to Asadabad, 2250 feet above Turbat itself. The Godar-i-Baidar commands a splendid view of the grass green hollows on its north, and notwithstanding incessant rain and inseparable discomforts, there was much to charm the eye in the landscape presented. Our second march was to Sharifabad; the rain continued, but with less persistence and force than the day before, and the cold

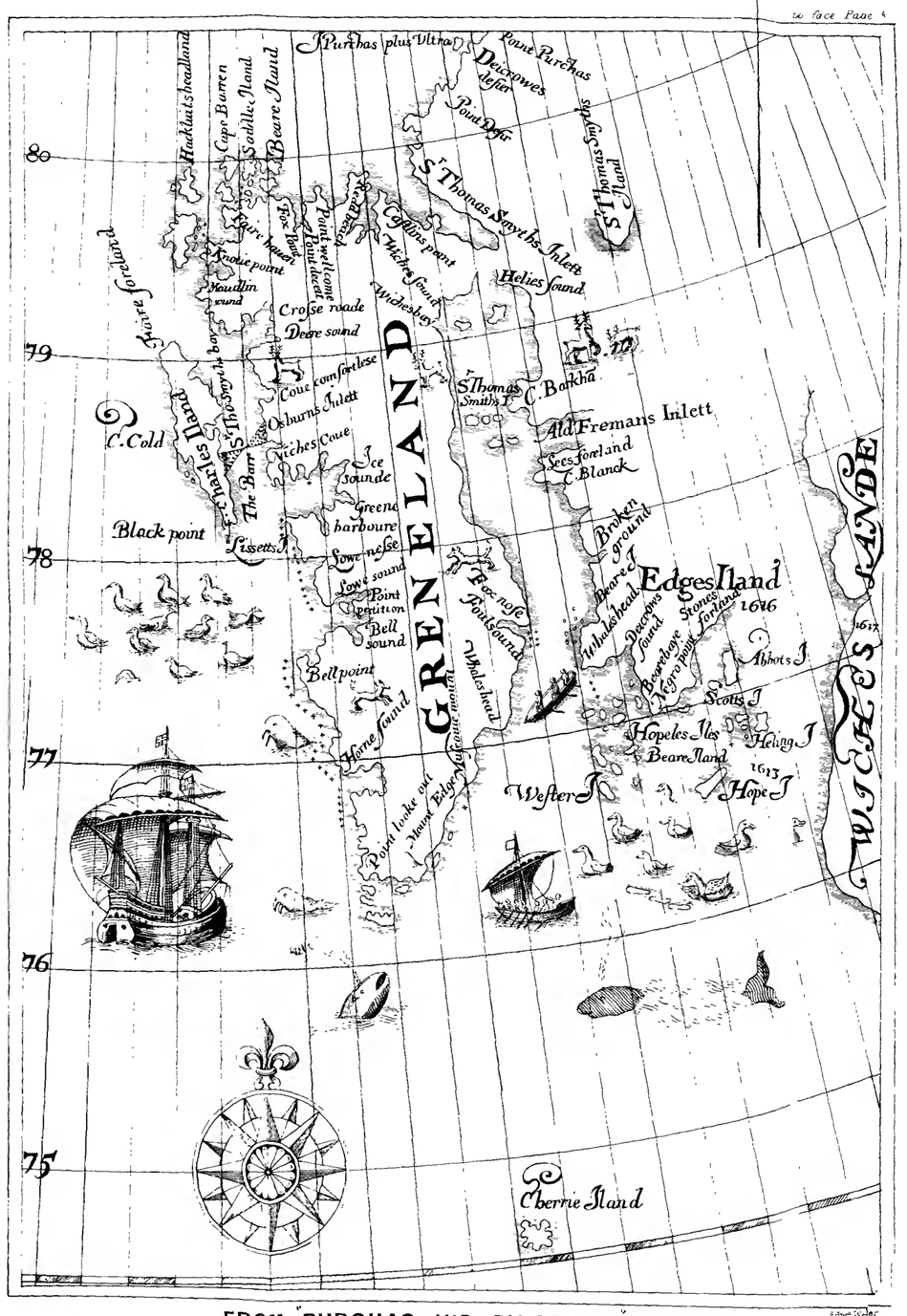
was not harassing. Owing to reports of late raids on this particular road, we were requested to move cautiously, sending off our camels under a guard at night and keeping the mules close to our own party. This precaution, as on former occasions, applied to the passage of plains or valleys after partial descent from the mountains; but we were now provided with a goodly escort, and could send out horsemen to reconnoitre if required. In fact we had at our disposal from Turbat, a strong troop of cavaliers under a smart commandant, and, to all appearance, a good working body. Sharifabad is the first postal station out of Mash-had on the Tehran road, so that our march thence into the former city was a retrograde movement. However, under any circumstances, it would not have been *etiquette* to have arrived so near the Prince-Governor's headquarters and turned away without visiting His Royal Highness. Our servants, moreover, had done continuous hard and good service, and were eagerly longing for this particular break in the return journey.

From Sharifabad to Mash-had is a distance of 21 miles; about two-thirds of the way are through the mountain range, and the remaining third is across the large plain on which stands the city so eminently revered by the Shia Moslem. Indeed to the whole Muhamadan world, Mash-had is a spot of special sanctity and repute, and Suni and Shia both pay their devoirs at the shrine of Imam Raza. The Arabic word "Mash-had," signifying a place of martyrdom or testimony in the cause of religion, should apply to the death of the Imam in prison by the administration of a poisoned date. On reaching the high land, whence a view of the minarets and golden dome is first obtained, orthodox Persian travellers bow reverentially in acknowledgment of the locality which they have been privileged to visit. At certain conspicuous points within sight of the shrine are groups of graves, to which it is believed the eye of the buried saint may turn with profit to the departed. Yet with all this outer semblance of holiness, and notwithstanding the presumable respectability of the atmosphere, it is to be feared that the Mash-hadi has no higher *morale* than his fellows. One of the special attendants deputed to us from the Prince-Governor informed me that the "inhabitant of Khurasan was notoriously a liar." He was speaking with reference to certain current stories about Turkomans, the truth of which he more than doubted.

Among objects of interest observed during the recent journey, perhaps the most notable in a general sense, was the "Reg-i-Ruwan" or moving sand, which tradition makes the resting-place of Imam Zaid. This is to be found at a hill between Kalah Kah and the Harud River, near the Perso-Afghan frontier, where deep

Nieuwe afteekening van
Het Eyland
SPITS-BERGEN
opgegeven door de Commandeurs
Giles en Outger Rep,
en in't Ligt gebragt en uytge-
geven door
Gerard van Keulen
Boek en Zeekaart verkooper
aan de Nieuwen brug
met Privilegie voor 15 Jaaren.

LATEST EDITION OF VAN KEULENS CHART OF SPITZBERGEN
1707



FROM "PURCHAS HIS PILGRIMES" VOL. III

drift sand has become massed in a long, broad, steep line from top to bottom of the southern face, the rest of the surface being quite clear. A mysterious noise produced by this sand at uncertain periods, and echoed at a considerable distance, is asserted to bear a supernatural meaning; the place is consequently one of pilgrimage, to Afghans and other Mubamadans, and many make their way there to pay their respects to the supposed shrine or consult the supposed oracle. The ascent is attended with labour and difficulty, as we were able to testify from ocular evidence.

We were all glad to leave Mash-had, a place so frequently described by writers, from Tavernier and Chardin to the present time, that detailed mention of it might now be superfluous. The dampness of the season and noxious exhalations made the garden, however large and luxuriant, and notwithstanding its privacy and many advantages, an ineligible spot for residence under canvas. And the presence of the shrine affected our establishment to the detriment of efficiency. With few exceptions its members were insensibly led to what in the eyes of a European observer would be the verge of demoralisation.

V.—*On Discoveries East of Spitzbergen and Approaches towards the North Pole on the Spitzbergen Meridian.* By C. R. MARKHAM, Esq., C.B., F.R.S., Secretary R.G.S.

[*Read*, February 10th, 1873.]

A GOVERNMENT Arctic Expedition must proceed in the direction which offers the three essential points that will justify the Government in sanctioning its despatch, namely, the certainty of exploring an unknown area of considerable extent, the best prospect of the explored area yielding valuable results in various branches of science, and security for the safety of the explorers. That direction is, in the opinion of all naval Arctic authorities, by Smith Sound; and the reasons for that opinion will, I trust, be fully explained in the course of the present session.

But there are other routes by which the unknown region around the North Pole can be approached, and all present points of geographical interest. In the direction of Spitzbergen much has recently been done; and it has been thought desirable that the meeting should be presented with a sketch of the various discoveries that have been made to the eastward of

the Spitzbergen group of late years, and of the attempts to attain a high latitude on the Spitzbergen meridians.

The western and northern coasts of Spitzbergen have been well known for nearly three centuries, and a brief allusion to the natural causes which have enabled thousands of vessels to visit them during the last 276 years, while the eastern shore and its off-lying islands still await thorough exploration, is a necessary preface to what follows.

The great Spitzbergen archipelago feels the effect of two ocean currents flowing from opposite directions. The Polar stream flows from east to west along the coast of Siberia, receiving great harvests of drift-wood from the Asiatic rivers. It then sweeps round the north end of Novaya Zemlya, and drifts the polar ice and the Siberian trees upon the north-eastern and eastern shores of Spitzbergen and its outlying islands. Hence the eastern side is blocked up with ice during most seasons, and its beaches are covered with drift-wood. The Polar current also carries the ice down between Spitzbergen and Greenland, and along the east coast of Greenland to Cape Farewell, at the maximum rate, according to Scoresby, of from 8 to 12 miles a day. The warm current from the Atlantic forks-off the south end of Spitzbergen. One portion flows on to the Novaya Zemlya coast, where it eventually mingles its water with the Polar current. The other branch flows up the west coast of Spitzbergen and keeps itself comparatively free from ice, although the ice streaming out of the Spitzbergen fiords edges it off to some distance from the land. Meeting the Polar current, its greater specific gravity, caused by its containing more salt than the Polar water, makes it plunge into the depths, and for a time become a submarine current, flowing in a direction contrary to that of the Polar current. Salt-water weighs 28 per cent. more than distilled water, and the Gulf Stream contains 35 thousandths of salt to 33 thousandths in the Polar current. Moreover, bodies of water in rapid motion do not readily interchange their temperatures, so that a warm stream might flow beneath a cold stratum for a considerable distance without mixing. Thus, when Mr. Leigh Smith obtained some sea temperatures at various depths, off the north-west point of Spitzbergen, while the water on the surface was only a degree or two above freezing, the temperature at 500 fathoms was 52°, and once even 64° Fahr. Scoresby also suggests that the warm stratum is an extension of the Gulf Stream, which, on meeting with water near the ice lighter than itself, sinks below the surface and becomes, for a time, a counter under-current. The branch of the Gulf Stream which thus becomes a submarine current, slowly and gradually mixes its waters

with the Polar stream as it loses its velocity, owing to the tendency of the warm water to rise; and eventually becomes a part of it. Thus Forchhammer has ascertained that the cold current flowing down the east coast of Greenland from the north contains Atlantic water. These oceanic movements account for the ease with which western and northern Spitzbergen have been explored, while the eastern side still retains many of its secrets, and invites the explorer.

Old Purchas wrongly claimed the discovery of Spitzbergen for the ill-fated Sir Hugh Willoughby in 1553, and later map-makers, to get rid of the claim, invented a "*Willoughby Land*" between Spitzbergen and Novaya Zemlya; but the fact is, as has been satisfactorily shown by Mr. Rundall, that it was the coast of Novaya Zemlya itself that Willoughby reached before he and his crew met their dreadful end in the Lapland harbour.

In reality, William Barents, the gallant Dutchman, discovered Spitzbergen in 1596. But he did not, as Dr. Beke and Dr. Petermann suppose, sail up the east side and circumnavigate the largest island in the group. That feat has never yet been performed. Dr. Beke adopted the circumnavigation theory from the statement in Gerrit de Veer's Journal, that Barents steered a little east of north from Bear Island. But the Journal is vague, and other entries go to prove that the ship of Barents was never on the east coast. De Veer speaks of land on his right hand, and of an east wind coming off the land. The question is set at rest by the nearly contemporaneous map of Hondius, which was specially prepared to illustrate the "*admiranda navigatio*" of Barents, and published, in 1611, in the work on Amsterdam by Pontanus. It shows a small portion of the western and northern shores of Spitzbergen, and the track of Barents. The great Dutch navigator sighted land on the 19th of June, 1596, in 79° 49′, near the extreme northern end of the west coast; and at the western point he found so great a number of birds that they flew against the sails, so he called the point *Vogelsang*.

Although discovered far from Spitzbergen, I cannot refrain from digressing, for a few moments, in order to allude to the relics of Barents which Captain Carlsen found in the ancient winter quarters on Novaya Zemlya in 1871. No man had entered the lonely dwelling, where the famous discoverer of Spitzbergen had sojourned during the long winter of 1596, for nearly three centuries. There stood the cooking-pans over the fire-place, the old clock against the wall, the arms, the tools, the drinking vessels, the instruments, and the books that had beguiled the weary hours of that long night, 278 years ago. I regret that these precious relics could not have been exhibited

at one of our meetings, before they were sent to their proper abiding-place at the Hague. But I am able to place on the table a small photograph of the group of relics, which has been taken in Holland. Perhaps the most touching is the pair of small shoes. There was a little cabin boy among the crew, who died, as Gerrit de Veer tells us, during the winter. This accounts for the shoes having been left behind. There is a flute too, once played by that poor boy, which will still give out a few notes.

Barents called the newly-discovered land "Greenland," and the early Dutch voyagers, who followed him, gave it the name of "Nieuland." The English named it "King James his Newland;" but in a tract published by Hessel Gerard, in 1613, the land was called "Spitzbergen," a name which has since been universally adopted.

Henry Hudson, in June and July 1607, only saw the north and west coasts, like Barents before him; but his voyage led to a succession of whaling ventures under the auspices of the Muscovy Company, from 1609 to 1622, when several discoveries were made to the eastward. Thomas Edge seems to have been the leading spirit in these undertakings; and the names of Ralph Freeman, Deicrowe, Heley, Barkham, and others, preserved in bays and straits, are those of the worthy merchant-adventurers who provided the means. In 1613 and 1614 the English whalers discovered Hope Island, and other islands to the south-eastward of Spitzbergen. In 1616 Captain Edge sent a pinnace to the eastward, to explore EDGE ISLAND, and other land on the east side, as far as 78° N. This pinnace was a boat of 20 tons, with a crew of 12 men. She is portrayed on the curious old chart of Spitzbergen in Purchas's 'Pilgrimes,' a copy of which lies on the table, pulling up Stor Fiord. The pinnace's crew killed a thousand seahorses on Edge Island, and got 1300 tons of oil by the 14th of August. In 1617 Captain Edge again led a whaling fleet to Spitzbergen. One of the ships, a vessel of 60 tons, with a crew of 20 men, discovered the east coast as far north as 79°, as well as extensive land still further to the eastward, which is shown on the chart of Purchas, and called WICHE'S LAND. It is important to bear this in mind, for *Wiche's Land* is certainly the "*King Karl Land*" of recent explorers. In subsequent years there were frequent collisions with the Dutch fleet, and the English found it more and more difficult to hold their own. Eventually, for many years, the trade fell almost entirely into the hands of the Hollanders.

But during the time that the English mariners were in the ascendant in the Spitzbergen seas, from the voyage of stout Henry Hudson in 1607 to about 1622, they did excellent geo-

graphical work; which is shown on the chart of Purchas. Here we have the whole of the west and north sides of Spitzbergen, with their fiords and off-lying islets delineated and named, as well as part of the strait between the main island and North-East Land, called Sir Thomas Smith's Inlet, but which was afterwards named the Waygat or Hinlopen Strait, after a rich Amsterdam burgomaster of that name. We have North-East Land, called Sir Thomas Smyth's Island. We have the whole of what is now called Stor Fiord by the Swedes, with the west and south sides of Edge Island, and Alderman Freeman's Inlet on its northern shore; and we have WICHE'S LAND far to the east, discovered by the English in 1617, but never seen again, or at least delineated on a map, until 1870.

Thus was the greater part of Spitzbergen fairly mapped by the English, and names given to the principal features. Those features were improperly named again by the Dutch, but the more ancient English names ought on all occasions now to be adopted, except, of course, those given by Barents, which have a prior claim. The old names should be restored on all new maps; and we rejoice to see that Dr. Petermann is, as a rule, careful to preserve and restore the earliest name on every occasion when the locality to which it was given can be clearly identified.

The Dutch frequenters of Spitzbergen had made no material addition to a knowledge of the group up to the end of the seventeenth century. They never went beyond the Seven Islands and Hinlopen Strait, on the north coast; and, in a bad year, they went round to the east by doubling the south point of Spitzbergen, and proceeding to a great fishery in Disco Bay, off Edge Island. This is quite clear from what Frederick Martens tells us, who went to Spitzbergen in 1671, and wrote the best account of the group previous to the publication of Scoresby's work. He says—"Then follow the Seven Islands. We saw no ships go any further, neither could I understand that ever any ship did go further, nor can they go so far every year, towards the east, because of the danger of the ice. It is unknown whether the Waygat goeth through the country or no."

But 35 years after the time of Martens, two Dutch captains, named Cornelius Giles and Rutger Reps, made voyages to the eastward, such as have never been equalled up to the present day. Captain Giles, in 1707, passed more than a degree to the northward of the Seven Islands without any hindrance from ice, then sailed east for some leagues in an open sea, then bent his course south-east and afterwards south. In latitude 80° N. he saw very high land about 25 miles to the east from North-East

Land, which has since been known as Giles's or Gillis Land. He then ran along the side of North-East Land, entered Hinlopen Strait, and anchored in Lomme Bay, where he took two whales. This information was collected from Walig and other whaling captains at Helder in 1775, and is given by Danes Barrington. It exactly agrees, in all respects, with Van Keulen's chart. Thus the Dutch ascertained that the two inlets discovered and named by the English after Sir Thomas Smith and Alderman Freeman were in reality straits, and they called them Hinloper and Walter Tymens respectively. The Dutch also discovered the Seven Islands, the east coast of North-East Land, Giles's Land, and three islands off the east coast of Edge Island, which they named Rijk Ys Islands. But they never saw the Wyche Land of the English farther east, and that land was so clean forgotten that both Scoresby and the captain of the *Recherche* in their maps, put "*Wiche Land*" as another name for the Rijk Ys Islands.

The Dutch knowledge of Spitzbergen is embodied in the chart of the Van Keulens, father and son, which went through several editions, and was the best authority on the subject throughout the eighteenth century. A copy of the latest edition lies on the table—a coloured tracing, procured for me at the Hague, by Commodore Jansen. John van Keulen, the father, died in about 1705, and the son, Gerhard van Keulen, issued his last publication in 1728. The last edition of their Spitzbergen chart was published after the return of Captains Giles and Rutger Reps, and shows their discoveries. Their names are on its title. Dr. Petermann has written rather disparagingly of Van Keulen's chart, and has altered the position of Giles's (or Gillis) Land from 80° to 81° 30′, referring to Barrington as his authority. But the account in Barrington agrees exactly with Van Keulen's chart, and with the bearings taken by Tobiesen in 1864, so that the alteration is a mistake. Mr. Foster, who was one of the lieutenants in Parry's expedition of 1827, gives a very different estimate of the value of Van Keulen's work. He says:—"We recognised distinctly almost every feature of the lands delineated in the old Dutch chart;" and he adds that several of the glaciers in Hinlopen Strait were faithfully laid down.

The whaling trade of the Hollanders gradually came to an end in the last half of the last century. Many names round the Spitzbergen shores, and great numbers of graves, remain as memorials of their former hardihood. Treurenberg, the great bay on the northern coast, is from *treuren* to mourn, and Parry found numerous Dutch graves on every point, with dates from 1640 to 1738. It is a pity that the Dutch should not resume

their Spitzbergen enterprises, and, reviving the memory of former achievements, once more take their place among Arctic explorers. Surely the countrymen of Barents, of Klamingh, and of Linschoten have the old spirit left among them, and are ready to assume their rightful part in the same rank with the explorers of other countries who are now gathering and marshalling their forces for an onslaught upon the vast unknown Polar regions.

Scoresby and the English whalers, in the second half of the last and commencement of the present century, only frequented the seas to the west and north of Spitzbergen, making no additions to our knowledge to the eastward; and the expeditions of Tchitchekoff, Phipps, Buchan, Clavering, Parry, and the *Recherche* confined their operations to the same direction. Phipps did not go east of the Seven Islands, of which he made a partial survey. Parry saw distant high land to the east of the Seven Islands, which must, no doubt, have been Cape Platen or North-East Land, and the islands of Rutger Reps, Charles XII., and Broch and Foyn to the north-east of it, the two last discovered by Mr. Leigh Smith in 1871. Lieutenant Foster surveyed a part of Hinlopen Strait, as far south as 79° 33′ N., and gave the names of Cape Fanshawe and Foster Islands to a point of land and a small group in that strait at his furthest point.

All the knowledge that has since been acquired to the eastward of Spitzbergen has been due to the Swedish and German expeditions, to the gallant enterprises of English yachtsmen, and to Norwegian captains under the auspices of Professor Mohn of Christiania, to whom geographers owe a large debt of gratitude for his exertions. Professor Mohn has induced the captains of Norwegian sealers to take observations, and to furnish him with notes of their voyages; and hence the names and discoveries of Johnsen, Tobiesen, Carlsen, Isaksen, Mack, Ulve, Nilsen, Aarström, Mathilas, and Altmann have become known to students of Arctic geography.

In 1861 Mr. Lamont, an English yachtsman, was off the south coast of Edge's Land, and among the thousand islands, extending his voyage as far as the Rijk Ys Islands of the Dutch, which Scoresby had supposed to be Wiche's Land. Mr. Birkbeck also made a yacht voyage to Spitzbergen in 1862, accompanied by Professor Newton, of Cambridge, and Mr. Graham Manners Sutton; and he hired a Norwegian sloop to accompany him. The two vessels separated off Stor Fiord. Mr. Newton, in the yacht, tried in vain to sail up the Fiord; while the sloop held on to the north-east as far as the Rijk Ys Islands, and sighted distant land to the eastward, which must have

been Wiche's Land. But the sloop was stopped by the ice, and had to return without doing as much as had been hoped.

The Swedish investigations in Spitzbergen have been continued, under Nordenskiold, in five consecutive expeditions during 1858, 1861, 1864, 1868, and 1872. Although the valuable observations and collections of the Swedes were chiefly confined to the south, west, and north-west coasts, yet they pressed further east, on the north coast, than either Phipps or Parry, and rounded Cape Platen, to the east of the Seven Islands. They also, in 1864 and 1868, went down Hinlopen Strait nearly to its south-eastern outlet, and sighted land to the eastward, which is called "Swedish Foreland" on the charts, but which they at first believed to be the Giles's Land of Van Keulen's chart. Captain Koldewey, in command of the German expedition, also sailed down Hinlopen Strait in August 1868, and sighted Swedish Foreland.

In 1870 Baron von Heuglin sailed for Spitzbergen in a vessel commanded by the Norwegian captain Nils Isaksen, examining all the shores of Stor Fiord as far as Heley's Sound, which separates a large island (since called Barents' Island) from the main land of Spitzbergen. Von Heuglin also examined the whole extent of Alderman Freeman's Strait, (Walter Thymen's Strait of the Dutch) which divides Edge Island from Barents' Island. He rounded the north-easternmost point of Edge Island, which has been named Cape Heuglin. From his extreme point, on August 16th, 1870, he sighted extensive land on the eastern horizon, consisting of a range of peaks half covered with snow, with land behind them. He believed this to be a discovery, and to be a part of a great continent, and named it "King Karl Land." But it is undoubtedly the WICHE'S LAND discovered by the English in 1617, and re-discovered by Mr. Birkbeck in 1864, when it was seen for the first time since the seventeenth century,—an interval of 247 years.

It is to the hardy Norwegian sealing captains, and to Professor Mohn who has collected their work, that much of our knowledge of the eastern side of Spitzbergen is due. The fishery has been carried on by Norwegians since about 1820, but for many years they kept to the western side, and only by degrees extended their operations along the northern coast. They called the passage between the Seven Islands and the north cape of North-East Land the "Northern Gate," and the south-eastern outlet of Hinlopen Strait the "Southern Gate," and both were usually blocked up with ice. Captain Carlsen was the first to venture through the "Northern Gate" in 1863, and he completed the circumnavigation of Spitzbergen during

the month of August, in the brig *Jan Mayen*. On the 2nd he passed the Seven Islands, on the 14th he had rounded the extreme point of North-East Land, on the 16th he sighted Giles's Land, on the 18th he sailed along the coast of Barents and Edge islands, and on the 21st he rounded Hope Island. He thus completed the circumnavigation of the group; a feat which has never been performed before nor since. For this great nautical feat he has received a gold watch from the Royal Geographical Society.

In 1864 the Norwegians made a most important voyage, passing through the "Northern Gate," and returning in boats by the "Southern Gate," thus completing the circumnavigation of North-East Land; but they left their vessels behind.

Early in August 1864 Captain Tobiesen fell in with Captains Aarström and Mathilas off the Seven Islands, and they determined to pass the "Northern Gate" and round the eastern point of North-East Land in company. On the 7th, when about 12 miles N. by W. of that point, they sighted Giles's (Gillis) Land bearing S.E. by S. That unvisited isle, never seen since the stout Dutch skipper discovered it in 1707, remained in sight during the 7th and the whole of the 8th of August; and in the following days a great number of seals and walruses were secured on Great Island, the "Great Hoog Eyl" of the Dutch. But when they tried to return by the way they came, the Norwegians found so much drift-ice coming from the north, and blocking up the passage at "Walrus Islands," that escape in that direction was impossible. The three vessels then tried to make their way to the southward, along the east coast of North-East Land, which, as the Dutch described it, is bordered by a continuous ice field. They could not reach the "Southern Gate" in their vessels, so they were obliged to take to their boats and abandon their valuable property, including seals and walruses worth 1100*l*. The boats went up Hinlopen Strait, and all along the northern and western sides of Spitzbergen to Ice Fiord, a distance of 700 miles, before they were picked up,—Tobiesen by a sealing vessel, Aarström and Mathilas by the *Axel Thoresen* of the Swedish expedition. This remarkable adventure turned the attention of the Norwegians to eastern Spitzbergen, as a new country abounding in seals and walruses; and it was suggested that it would be easier to reach it by sailing directly east from Bear Island, instead of going round Spitzbergen to the "Northern Gate." In fact it was said that such a voyage was made by a Hammerfest captain in 1854, who actually landed either on Giles's or Wiche's Land. In July 1872 Captain Altmann sailed in a north-easterly direction from the Rijk Ys Islands, and reached

a land which he coasted along from the 28th to the 31st. The capes overlapped, and he believed it to consist of three large and five small islands. In the same year Captain Johnsen approached this land from the south, in the schooner *Lydiana*, sighting it on the 16th of August 1872. It was found to be an island about 44 miles long, and its south-eastern shore was covered with enormous quantities of drift-wood, for 100 yards up the beach. This island is the Wiche's Land discovered by the English in 1617, and sighted by Mr. Birkbeck in 1864, and by Von Heuglin in 1870. Captain Nilsen, also in 1872, visited the northern end of Wiche's Land, and sailed thence to the entrance of Hinlopen Strait. Captain Johnsen reports that the three islands of Altmann are but one, and the Swedish Foreland is probably but the northern end of Wiche's Land; possibly Giles's Land also.

But the most interesting voyages of recent times are those which have been undertaken by Mr. B. Leigh Smith, with a view to attaining the highest possible latitude, and of exploring the unknown lands to the eastward of Spitzbergen. In the year 1871 he was accompanied by the Norwegian Captain Ulve, and he was fortunate in finding a very favourable season for his purpose. He sailed down Hinlopen Strait in August, and reached a position at its south-eastern outlet, where Koldewey had been in 1868. He discovered this position, formerly supposed to be a peninsula, to be an island, having walked round it while out shooting, at one spell of eighteen hours. It is marked on the map as Waygat or Wilhelm Island. From this point he could see the land on the opposite shore, stretching far away a little north of east, and the farthest point was named Cape Mohn. This discovery by Smith and Ulve gives a considerable prolongation to the southern shore of North-East Land. The eastern sea was blocked with ice as usual, so Mr. Smith returned to the north coast, and visited the Seven Islands in September. He then rounded Cape Platen, and sailed about 40 miles to the eastward, where the coast of North-East Land was still tending towards the east. The farthest visible point has been named Cape Smith. His observations have considerably altered the shape and enlarged the area of North-East Land, both the southern and northern shores extending very much farther to the eastward than was previously supposed. In 1872 Mr. Leigh Smith again sailed for Spitzbergen in his yacht the *Sampson*, but it was an unfavourable season. His vessel was considerably injured by the ice, and he was unable to get farther east, on the north coast, than Weyde Bay.

In the spring of 1873 he sailed on a third voyage, and this

time he had a fine steamer, the *Diana*, capitally adapted for the work, in which he intended to press still further to the eastward, and complete the discovery of Giles's Land, as well as to attain a very high northern latitude. It would seem from the experience of last year, that when the ice is close down upon the north-west coast of Spitzbergen, the sea is remarkably open to the east, and also on the east coast of Greenland, so that Mr. Smith had two chances of a successful cruize. But the season was again unfavourable, and he returned in September 1873, with valuable zoological collections and many interesting photographs, but without having achieved any geographical result. He, however, advanced a considerable distance down Hinlopen Strait and made some valuable observations. The Swedish Expedition wintered in Mussel Bay, on the north coast of Spitzbergen, in 1872–73, and returned in the autumn of 1873, having been unable to advance beyond the Seven Islands.

As—for the reasons explained at the beginning of this paper—vessels have hitherto been able to attain a higher latitude by sailing up the west side of Spitzbergen than on any other meridian, this achievement has always had special interest for explorers in that direction. In some seasons there is much open water,—in September, after vast masses of ice have been drifting south during the whole summer, and a very high latitude might possibly be attained in that month; but the nights are commencing, young ice is forming, and the difficulties are increasing each hour. An unusually early season—in May—such as Scoresby found in 1806, probably offers better chances of success.

The way in which the Scoresbys forced their way to the north, early in the spring, is both interesting and instructive. They entered the ice in the good ship *Resolution* on the 28th of April, in latitude 76° N., and found it to be of extraordinary width and compactness. The elder Scoresby pressed into ice, which to ordinary apprehension was impenetrable; but now was shown the value of experience and intelligence. The experienced eye of the veteran ice-navigator alone discerned indications of open water to the northward. There was a strong "ice blink" along the northern horizon, which, to all minds on board but one, precluded hope. But Scoresby, narrowly scanning this "ice blink" from the main topmast head, discerned a bluish grey streak *below* the "ice blink," and closely skirting the horizon. He knew this to be an indication of water beyond the pack, yet it might merely be a transient lane or pool and of no extent. But the watchful veteran detected another sign. He perceived occasionally a very light motion of the water in contact with lumps of ice near the ship.

He knew that this could only arise from a distant swell, which must proceed from an open sea either to the south or north. The distance he had penetrated into the ice, and the unmixed "ice blink" astern, convinced him that it did not come from the south. With conviction came the resolution to push on through the formidable body of consolidated ice still before him. Every effort was made, boats were hoisted and lowered to break the ice ahead, channels were cut with ice saws, the crews towed, tracked, and sallied the ship, by running in a body from one side to the other. At length, in 80° N., an open sea was reached. It was bounded on the north, in about 82°, by the solid Polar pack, but was 50 or 60 miles wide, and extended for an unascertained distance from E.N.E. to W.S.W. The fact was that, from reasons due probably to prevailing winds, a great mass of ice had broken off from the main pack and drifted south very early in the spring, before the main pack began to move, thus leaving this broad open lane, which would of course disappear when the main body began to move, later in the season. Meanwhile, Scoresby sailed across it to the edge of the northern pack, taking several whales; and at midnight on the 24th of May, a careful observation gave him a latitude of 81° 12′ 42″ N. Next morning his latitude by dead reckoning was 81° 30′ N. in 19° E., where the ice was fixed and solid to the north, but there was an open sea from E.N.E. to S.E. with a water sky.

The Swedish Expedition of 1868, in the iron steamer *Sophia*, attained a latitude of 81° 42′ N. in September; and in 1871, Mr. Leigh Smith reached 81° 24′ N. in the same month, both being nearly on the same meridian, about 18° E. [Swedes, 17° 20′ E.; Smith, 18° 35′ E.]

A great number of stories have been told of Dutch and English vessels having attained still higher latitudes, most of which were collected by Mr. Daines Barrington, after the return of Captain Phipps's expedition. I have carefully examined them all, and find that the great majority are fabulous, and that all rest on totally insufficient evidence. I have given them in a tabular form in the Society's 'Proceedings;' and the list has just been amended and added to, and reprinted with other Arctic papers.

Much has been said of late years about an open Polar basin beyond the ice which floats south in the summer. I submit that too much speculation is unprofitable, and that, for those who are so fortunate as to be able to do so, it is far better to go and see than to speculate. Still it may be as well, in conclusion, to touch upon the principal arguments of those who believe in a vast navigable ocean, free of ice, round the Pole.

I believe no one really thinks that the Gulf Stream, after passing under many hundreds of miles of a cold superstratum of water, emerges from the depths and reaches the surface at so warm a temperature near the North Pole as to melt the ice far and wide. The Gulf Stream slowly mingles with the Polar current, and eventually its waters go south again along the east coast of Greenland, on the surface.

But there are two other arguments which deserve passing notice.

One is—that the sun, with greater power than it has at the equator, pours its rays on the North Pole without intermission for six months. Scoresby answered this argument 50 years ago. He pointed out that, in Northern Spitzbergen, the sun also has greater power than at the equator, and shines for four months without intermission. Yet in that region the average annual temperature is 17° Fahr., and ice forms on the sea during ten months out of twelve. The difference that the other two months would make is inappreciable, seeing that the four months of sun make so little. Speculators on this question have left many points out of consideration. They forget that the sun's rays are more powerful at Edinburgh than at Mauritius, as Buchan has mentioned; and this should at once show them the absurdity of their argument. The dryness of the Polar atmosphere is equally the cause of the great heating power of the sun's rays, and, by reason of the more rapid terrestrial radiation, of the excessive cold.

The other argument is much more generally adopted, and appears, at first sight, more plausible. It is that the enormous fields and floes of ice which drift away to the south during the summer leave a wide space of open sea round the Pole. By way of proof it is urged that, in the Antarctic regions, Sir James Ross pushed through 800 miles of pack-ice, and reached an open sea to the south of it, being the space whence it had drifted. But the analogy is false, as Admiral Collinson well pointed out at a meeting of the Society in 1865. The Antarctic pack was drifted away from a solid line of immovable grounded ice-cliffs, and of course left open water in its rear, because there was no moving ice further south to take its place. Unless there is a continent, or a similar immovable line of ice-cliff at the North Pole, the North Polar pack does nothing of the kind. The exact analogy to the voyage of Sir James Ross is that of Scoresby. The Antarctic pack, in latitude 75° S., is analogous to the ice met by whalers in the early spring in 75° to 76° N., through which they can usually pass. The open water north of Spitzbergen is analogous to the open sea found by Ross in the south; and the Polar pack which Scoresby found bounding

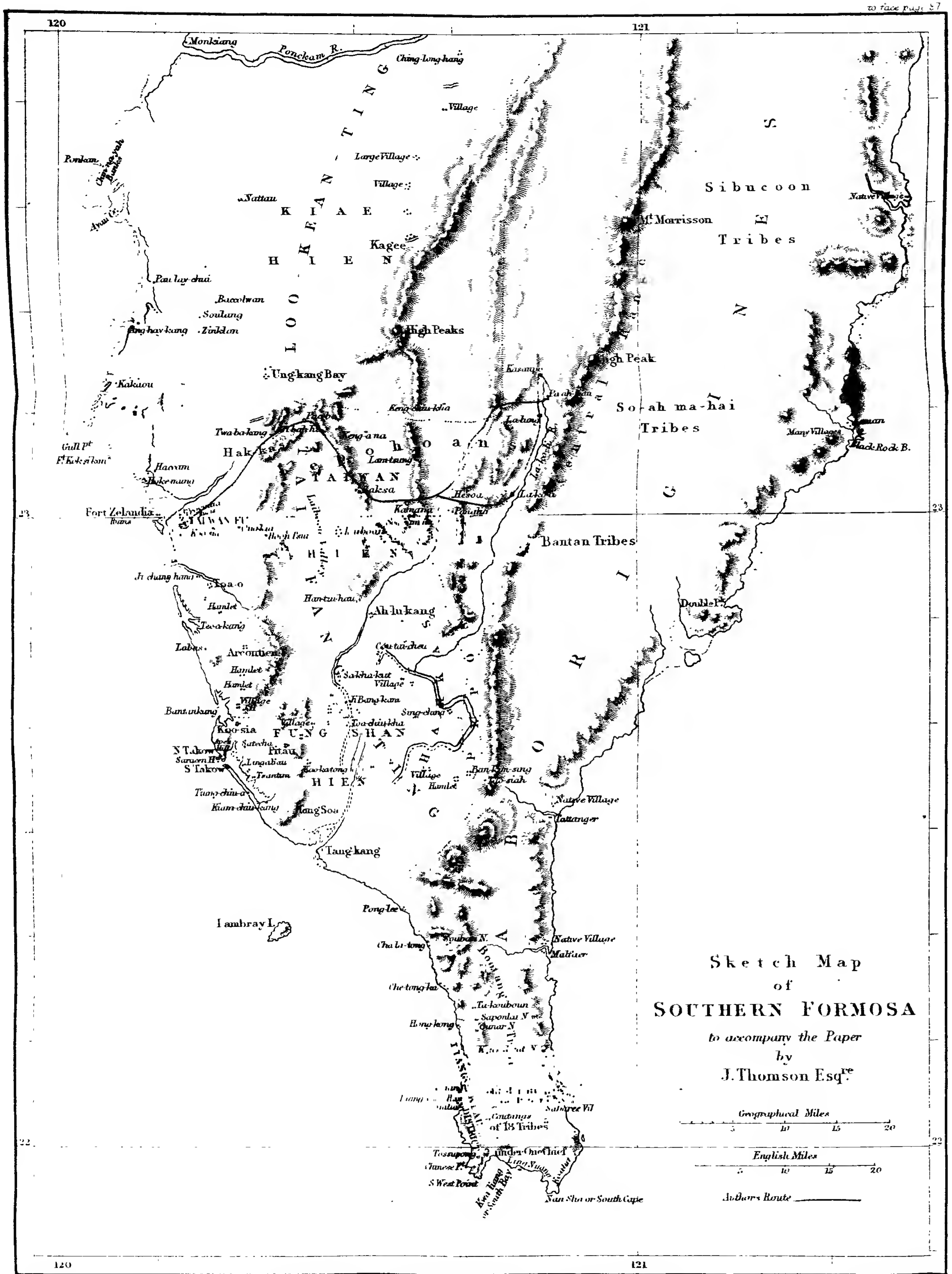
that open water to the north, from whence the ice he had passed through had drifted, is analogous to Ross's line of impenetrable ice-barrier.

The reason that no open Polar basin exists is, that there is no extent of land or grounded ice-barrier at the North Pole from whence the ice could drift and leave an open sea. This may be assumed for two reasons. One is, that the masses of Siberian drift-wood on the Spitzbergen islands and elsewhere would be intercepted if there was an extensive continent in their way. The other is, that, as Parry advanced to his extreme point in 82° 45′ N., he saw no flights of birds, but a solitude; and the water north of Spitzbergen rapidly becomes of very great depth. The North Polar land, if it exists, will probably be found in islands stretching north of the extreme north point on the west side of Kennedy Channel; and this is one reason why the route by Smith Sound should be selected for a Government Arctic expedition.

The North Polar pack, drifting south, according to Scoresby, between Spitzbergen and Greenland, at the maximum rate of 8 or 10 miles a day, if there is no extensive land to the north, of course extends to far beyond the North Pole, as far as is formed on the other side, in 75° or 74°, a width of some 1000 miles. The open sea left by its drift would not be at the North Pole, but on the coasts of Wrangell Land and Siberia, where the drift commences. No doubt, in the summer thaws there is a great expansion of the ice, which causes open lanes and pools, at times of considerable extent; and other open seas would be caused by winds and currents throughout the year; but I submit that the above considerations lead to the conclusion that a great, permanent, open sea round the North Pole is chimerical.

Nevertheless there is much that is interesting in the examination of the deep sea to the north of Spitzbergen. With a good screw-steamer, ably commanded by an experienced ice navigator, taking advantage of every opening, and knowing when to charge the ice and when to forbear, a very much higher latitude might certainly be reached, in a favourable season, than has ever yet been achieved. Observations might then be made with regard to currents and sea temperatures, and to meteorology. With such an open lane of water to the eastward as Scoresby saw in 1806, much important exploration might also be accomplished to the eastward of Spitzbergen. But all of course depends upon the state of the ice, which varies every year.

A Government Arctic expedition should go by Smith Sound, because that is the direction by which the most extensive



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Edw.d Weller

geographical discoveries and the highest northern latitude can certainly be attained; and because by that route the most important results in other branches of science can be secured. But I have endeavoured to show that much valuable and interesting work may, in a fortunate season, also be done in the direction of Spitzbergen by private enterprise. Mr. Leigh Smith (who is becoming a veteran Arctic explorer), with his good steamer *Diana*, did all that skill and perseverance, combined with experience, could achieve in a struggle with the ice; but he was unsuccessful in his attempt to go beyond his predecessors. A season like that found by Scoresby in 1806, or by the older Dutch navigator Giles in 1707, with Mr. Leigh Smith in a powerful screw-steamer on the spot, might insure the exploration of Giles's Land and other unknown isles to the eastward, as well as a nearer approach to the North Pole; but such seasons are of very rare occurrence.

VI.—*Notes of a Journey in Southern Formosa.* By J. THOMSON, F.R.G.S.

[*Read*, March 10th, 1873.]

THE following is a brief account of one of a series of journeys through China and Chinese territory, extending over a period of two years, and undertaken with the object of obtaining a collection of photographs of, and exact information regarding, the people and provinces visited.

I left Amoy, in company with Dr. Maxwell, in the steamer *Formosa*, on the night of April 1, 1871. We passed the Pescadore Islands at daybreak on the 2nd, and anchored off Takow, in Southern Formosa, at 2 o'clock on the same day. The harbour of Takow is approached through a narrow cleft in a bold ridge of rocks that for some distance skirt the shore. The channel over the bar is shallow, and can only be passed by vessels drawing at the most 12 feet of water. This is a great drawback to the rising trade of the place, as the majority of ships visiting the port have to anchor about a mile off, and discharge their cargoes in boats, an operation attended with difficulty and danger, owing to the heavy surf that rolls in upon the shore. We hired a native boat and landed in a sheltered bay in the rocks, as the boat could not make the mouth of the harbour. The rocks are of igneous formation, and are built up of a multitude of cells, the whole mass appearing to have been suddenly chilled while in a state of

ebullition, presenting a series of jagged, flint-like edges, difficult to ascend. Many of the cells contain a thin layer of sandy soil, supporting a few dwarfed shrubs and grasses, and a dwarf species of date-palm, producing a fruit that never reaches maturity.

The sand along the shore is very fine, regular, and of a jet black when wet with sea-water. A hill, over a thousand feet in height, known to foreigners as Ape's Hill, rises above the northern extremity of the harbour. It derives its name from the tribe of apes that find a home in its rocky heights. They are of unusual size, and, viewed from a distance, bear some resemblance to the "mias," or orang-outan of Borneo. Among the variety of flowering plants on this hill I noticed wild mint and minor convolvulus, with a small yellow flower climbing in rich profusion about the rocks and stunted palms. I obtained a commanding view of the harbour from Ape's Hill; it forms a shallow lagoon, over 6 miles in length by 2 in breadth; bounded on the east by a richly-cultivated plain, and protected from the sea on the west by an arm of sandy soil which joins the rocks at the entrance and sweeps round to the southern extremity in a green belt of tropical foliage. The village of Takow, and part of the small foreign settlement, are built upon this bank, which appears to have been indebted for its formation to the combined action of a river depositing its débris on the one side and to the action of the tide and surf building up the land on the other. The river is at the south of the harbour; its deep channel is now nearly dry. During the time of the Dutch occupation of Formosa, in the beginning of the seventeenth century, it probably formed an important approach inland, as it still bears the name of the Estuary of the Red Haired Race, a name commonly given to the early Dutch settlers.

The western portion of the island has been undergoing recent and rapid physical changes. I will be able to show, from what has taken place at Tai-wan-fu, that it is perfectly reasonable to suppose that the present harbour of Takow has been formed within the last 200 years. The bottom of the harbour of Takow is formed of soft sand and clay, and with the bar might be easily dredged and deepened to form one of the finest harbours in the China Sea. Such appliances, however, as dredging-machines, so obviously of advantage to the rapidly growing trade of the port, are still in advance of Chinese policy.

The imports of Takow consist of opium, cotton and woollen piece-goods, raw cotton, hemp bags, nankeens, and prepared tobacco; and the chief exports, of brown and white sugar,

sesamum-seeds, rice, sweet potatoes (extensively used as food by the natives), ground-nuts, lang-ngans, and turmeric. The increase of the trade of Takow is shown in the following quotation from the 'Customs' Gazette' for the quarter ending December 1870. The total dues and duties collected during that quarter amounted to 15,489tls. 9m. 8c. 3c., compared with 4,293tls. 6m. 4c. 5c. for the same period in 1868. This enormous increase in trade and the corresponding revenue is mainly due to the energy of the foreign traders, although partly to the slightly more liberal policy of the Chinese Government and to the rapidly developing resources of the island, which is remarkable for its fertility.

I left for Tai-wan-fu, in company with Dr. Maxwell, on the night of the 4th of April. We went on board the *Formosa*, which started at daylight next morning, and anchored 2 miles off the shore at Tai-wan-fu at 8 o'clock. The distance by sea from Takow to Tai-wan-fu is 25 miles. The surf was running high when we anchored. We, however, determined to land in a native surf-boat or catamaran, composed of a number of lengths of bamboo lashed together with ratan, so as to form a raft, to which is added a mast and mat sail. There is, also, a wooden tub placed on the raft for the accommodation of passengers going ashore; these tubs are never fixed in any way to the raft, so that when the raft is upset by a wave, a not unfrequent occurrence, the passenger is washed ashore in the tub. Thoroughly wet with the surf, we landed near the ruins of Fort Zelandia, a stronghold built by the Dutch in 1633, on an island, to protect the inner harbour.

In the Dutch accounts of Formosa* it is stated that Zelandia was an island where a spacious haven was formed; and further, that on April 31st, 1661, at break of day, Koshinga's fleet appeared before Taiwan, and ran into the spacious haven between Zelandia and Provintia, and anchored between the two forts. The two forts, Zelandia and Provintia, are separated by a distance of over three miles; and the haven referred to, in which the Chinese invader anchored his fleet, is now a dry, arid plain, over which there is a road, and several canals cut to communicate with the old port of Tai-wan-fu. A small portion of this plain is still flooded at high water. The water off the fort is now so shallow, that vessels have to anchor about 2 miles out.

Tai-wan-fu, the capital of Formosa, is a walled city of 70,000 inhabitants. The walls enclose a space 5 miles in circumference, planted to a great extent with fields and gardens, and

* 'The Chinese and Japanese Repository,' vol. i. p. 425.

still showing traces of the Dutch occupation in the ruins of Fort Provintia, and extensive parks, shaded with fine old trees, and groves of tall bamboo. The suburbs are intersected by a multitude of green lanes, having walls of cactus, interspersed with the brilliant flowers of the wild fuchsia and clusters of major convolvulus, and shaded by hedges of bamboo, which form a pointed arch over the path.

The inhabitants of this part of Southern Formosa are chiefly natives of the Fokien province and Hak-kas, a hardy race of emigrants from the north of China, who are daily carrying their arts and agriculture further into the territory claimed by the aborigines.

Dr. Maxwell and I left Tai-wan-fu on the 11th of April, on a visit to the Pepohoans, the half-civilized tribes of aborigines occupying the hill-country nearest to the central mountains. Our journey for the first 10 miles was over a highly-cultivated plain, dotted with farms and villages, surrounded with groves of bamboo, bananas, and areca palms. Having crossed the plain, we entered a hill-country, from which we could see the central range of mountains much more clearly than from the lower plain. These mountains are frequently invisible from ships at sea and from the western shore, as they are obscured by a veil of fine dust that rises from the plain and from the broken and disturbed country upon which we were just entering; at other times they are shut out from view by clouds of vapour rising from the land during the wet season. Many of the hills over which we had to pass presented bare surfaces of sand, clay, and limestone, supporting a scant herbage, suggesting more the idea of mounds of débris from a quarry than of the wood-clad hills I had expected to find in Formosa. The heat was intense, causing painful blisters on the feet in walking on the hot, baked clay surface of the pathway.

The land, in many places undermined by the mountain torrents, had fallen in, in great pits of irregular form. The Hak-kas, who inhabit this broken country, erect very temporary dwellings of bamboo, and mud thatched with grass, transferring these huts and small farms, from time to time, to suit the shifting nature of the soil, usually selecting the bottom of the large pits, where the land, for the time, has found its lowest level. We noticed many channels dried and abandoned where rivers had formerly, during the wet season, torn their way through the country, depositing, in their course, huge rock boulders, affording evidence of the force and power of the torrents by which they had been moved. We rested at Pao-be for the night, distant about 20 miles from Tai-wan-fu. This is the nearest settlement of Pepohoans. The villagers turned

out *en masse* to meet and welcome the Doctor, who had done much on former occasions to relieve their sufferings during sickness.

The Pepohoans in colour, form of face, and general appearance, resemble the Malays, although they seem to be a taller and superior type of the race. The vocabularies of the dialects of a number of the Pepohoan and mountain tribes show an affinity to the Malay language spoken in Singapore and Malacca, too striking to be the result of trading intercourse. There are differences in the dialects, easily accounted for by the division of the aborigines into tribes living apart from each other in their mountain hunting grounds.

We left at daylight on the 11th for Baksa, about 26 miles east of Tai-wan-fu. It is, however, a walk of about 10 miles from Poa-be, over a hill country similar to that described. We reached Baksa about 10 o'clock, where I obtained photographs of the place and types of the Pepohoans. The hills here are higher and more imposing, presenting in many places bold crags of limestone. The valleys are highly cultivated with rice, sweet potatoes, ground-nuts, and turmeric. Baksa Valley is one of the most beautiful sylvan spots in the island. The surrounding hills are well wooded, and the farmhouses are environed with groves of bamboo and fruit trees. On the hill to the east of Baksa there is a huge mass of limestone, known as the Hanging Rock of Baksa. The ascent is over masses of broken rock, composed of hard, flinty cells, and covered with luxuriant vegetation. There is a dark cavern beneath the enormous mass of limestone which appears to be poised on the hill with a few slender props of limestone. The natives who accompanied me, whilst engaged in cutting a trailing vine, narrowly escaped being bitten by three deadly-poisonous snakes of a pea-green colour, with flat lozenge-shaped heads. We dislodged them from the vine, and killed them before proceeding to photograph the rock.

Next morning we left for Kasampo, a circuitous walk of 26 miles over hills gradually increasing in height. I had hired six Baksa Pepohoans as bearers of my instruments and baggage. I thought that this walk would be a severe test of their powers of endurance. After the day's toil, however, they were able to join heartily in the amusements of the villagers of Kasampo. Chinese coolies could not have done the work. These Pepohoan bearers were remarkable for their cheerfulness, good-nature, and honesty; and these qualities appear to be characteristics of the race, as in their villages no precautions are observed against theft. It is only where they have been mixed up with the Chinese that they find it expedient to put locks

on their doors. During the entire journey, my boxes were left open and exposed day and night without my losing the value of a cash. We halted to rest at the village of Kamana, about 8 miles east of Baksa. We had again to cross over a broken, disturbed country, ascending and descending pits, of which the photograph will convey some idea. We suffered from want of water, as the streams were all dried up. The heat from the midday sun was intense, and uninterrupted by the shade of a single tree. The hot reflection from the white walls of the clay-pits made the air almost suffocating. Shortly after noon we halted, quite exhausted with the ascent of one of these pit walls. Seeking the shade of some shrubs we sat down on a rock, dislodging at the same time a nest of chocolate-coloured centipedes with bright yellow feet; they were of large size, between two and three inches long. We were too fatigued to move out of their way; fortunately they did not sting us. At our next resting-place a noxious shrub was accidentally broken by one of our party, and was found to emit a perfectly putrid odour. There is another remarkable trailing vine found in this part of the island, called "Ok-gue" by the Chinese. The fruit or seed contained in a pod is used, when dry, for making jelly. A small quantity of the seed placed in a coarse cotton bag, and allowed to soak in a cup of water, will transform the water into a nutritious jelly, having the colour and appearance of calf's-foot jelly. It may be mentioned, too, that the natives not only grow their tobacco, but they grow their tobacco-pipes around their huts, the pipes being formed of the roots and young stems of bamboo. Descending a high hill we entered a valley half cultivated and half covered with old forest. We were now close to the foot of the central mountain chain, and could see the mountains rise range above range, and, above all, the peak of Mount Morison, of a deep blue colour. It has an altitude of about 11,000 feet above the sea-level. The aspect of the country gradually became more grand and wild as we advanced inland.

We crossed the La-ko-li River to reach the small settlement of Pa-ah-lian. The bridge we crossed was simply made of three lengths of bamboo that spanned the stream, and were supported by, and fixed to, a pile of boulders on each bank. The bridge was raised about 12 feet above the river, so that a slip of the foot in crossing would have been serious. We, however, damped our straw sandals to make them more pliant, and got over with safety. These primitive bridges are kept in repair by the people in the neighbourhood, who find the bamboo on the bank, the ratan for lashings in the nearest thicket, and the boulders for piers everywhere around. The

mountains, at the foot of which we were now passing, were clad in forests of gigantic trees, the lower hunting-grounds of the savage tribes, who, not content with their advantages, make occasional raids upon their less savage kinsmen of the plains, as a means of clearing up old existing feuds. The Pepohoans of Pa-ah-liau have a much more savage bearing than those nearer the coast. They are tall, straight of limb, robust, and not so dark in complexion. The women had a very striking appearance; they were all smoking bamboo pipes ornamented with brass rings, and having a small leathern bag attached for holding tobacco. An old lady tried my cigar, which was handed round the village to smoke, and afterwards carefully returned. The women bind up their hair in a sort of cable, which they surround with a spiral of red cloth; the whole is then bound round the head to form a natural diadem. The dress is a short, tight-fitting jacket of blue calico, and skirt of the same material, with the addition of a bright border of red and yellow, falling to the knees. This dress reminded me of what I have seen worn by the Laos women in Siam and Cambodia, and also of the coloured woodcuts in Chinese books illustrating the dress and habits of the "Mian-tsze" of the mountain regions on the mainland. The men shave the head as the Chinese do. Their dress consists of a short jacket and short trousers of calico. The neighbouring hills are covered with wild guava, which grows to great perfection.

Following the stream, I enjoyed, for the first time in the East, a feast of wild raspberries. They were of a large size, and equal in flavour to those of this country. A walk of 6 miles from Pa-ah-liau brought us to Kasanpo, where we found rest in a native hut. The villagers had been engaged in thatching a house, and the owner had entertained them with a wine feast. After dark a huge fire was kindled on the clear space in front of the hut where we lodged, and where the villagers had assembled to have a dance. The old men and women, the children, and a number of long prick-eared hunting dogs, sat round the fire. As it blazed up, the red flare sported among the quivering leaves of the bamboos and the dark forms of the surrounding palms; while, with the fitful flames, the strange figures round the fire would burst into bold relief against the black night, and again vanish into impalpable shadows. Wood and reeds were piled on until the flames rose high, and with them the spirits of the party. The young men and women clearing a space, crossed hands, formed into a crescent, and danced to the time of a plaintive minor song; the time becoming faster and faster, and with it the feet of the

dancers, until the speed became furious, and the figures seemed to flit like phantoms through the dust that had risen in a red cloud around them; when the song was replaced by savage yells that woke the echoes of the hills.

Next day our host furnished us with an armed guide to proceed on to La-lung, a walk of 11 miles south. The guide thought it necessary to bring another armed friend, as we had to go through a dangerous pass in the mountains; he further enjoined us to observe strict silence. This part of our journey presented the grandest combination of mountain, forest, and river scenery. We were overtaken by an armed party on a fishing expedition, who, while we rested, amused themselves by shooting fish in the stream with bow and arrow, and by catching fresh-water crabs, which they devoured alive. Passing through the forest on the heights above La-lung, we were shown some fine specimens of the camphor-tree. We also noticed quantities of ratan, and on a space partly clear of underwood, a gigantic lily, standing about 8 feet high, having broad bending leaves, and a large cone of pink and white flowers. Above and around the trees were pendant with the thick, muscular-looking stems of climbing parasitic plants, passing from tree to tree, and forming a chaos like the confusion of ropes on a Chinese junk. We had a view of Mount Morison from the highest point of the ridge, where we met a Pepohoan, who had crossed the mountain from the other side of the island. He had to pay three bullocks as black mail to the tribes inhabiting these regions, for which they gave him a safe pass through their territory. He reported the existence of a fine harbour at the foot of Mount Morison, on the eastern side of the island, a harbour unknown, he said, to foreigners. La-lung is on the right bank of a rapid stream that sweeps round the foot of the mountains. This stream during the wet season, which begins in May and ends about September, swells into a torrent of about a mile broad, forming one of the great outlets for the drainage of the southern mountains. La-lung is the nearest settlement to the habitations of the savage tribes of the mountains.

We rested at La-lung for the night. The son of our host had just lost his wife, and had gone on a visit to a friendly tribe in the neighbouring mountains to find another. Next morning upon descending the bank of the river to obtain a photograph, a large snake reared his head across our path. I despatched him with a blow across the head from my bamboo staff. He was about seven or eight feet long; too large to bring away. I was anxious to cross the river, but was persuaded not to do so, owing to some existing feud, and the fact

that a party of hunters had about a month ago killed two men just opposite where we stood.

We started with our guides at 2 o'clock for La-ko-li, about 12 miles south of La-lung, where we expected to meet a party of savages who had gone there on a trading visit. Our path lay along what, during the wet season, forms the right bank of the river, presenting at this time a continuous precipice of 200 feet fronting its dry bed. Here, too, one meets with a remarkable combination of attractions in the scenery. At one place a mountain stream leaping out of a dark chasm, tumbling and foaming over the rocks, and again disappearing in the forest and everywhere around, one was impressed with the surpassing grandeur of the mountains, their gigantic forms softened and beautified with the luxuriant foliage of evergreen forests; or charmed to find a modest world of microscopic beauty in the minutest fissures of the surrounding rocks. La-ko-li was now before us, its hedges of cactus enclosing the huts, with their surroundings of palm, banana, laungan, and mango trees. It was nearly dark when we reached the house where we intended to rest for the night. In front, the house was adorned with festoons of boar and stag skulls, hunting trophies. A young man, over 6 feet in height, met us at the doorway; he was accompanied by his wife, a woman from a neighbouring mountain tribe. He looked savage and inhospitable, and referred us to his old father, who was smoking opium in an outer hut. We obtained shelter for the night, after some trouble. I had unfortunately to sit up till 1 o'clock, preparing my chemicals for the remainder of the journey. The water of La-ko-li is very alkaline; the banks of one or two streams were covered with what appeared to be crystals of soda. This occasioned me some trouble in photographing, until I discovered the cause, and applied an acid remedy in Chinese vinegar.

In the dry beds of one or two streams I observed quantities of slate and shale, and indications of the presence of coal, which is now forming an important article of commerce in the north of the island, and which in process of time will enable Formosa, as a great coal field, to contribute materially to the development and progress of the East. The country we passed through on our return route is much the same in its physical aspect as that already described.

After my return to Tai-wan-fu I travelled overland to Takow, with the object of penetrating to the savage territory further south. I was, however, stopped at Takow, as the mountain tribes were fighting in the south of the island.

RELIGION.

There are now among the Pepohoans over 1000 Christians, who build their own chapels, and who, to some extent, contribute to the support of teachers and schools. Their old religion, or fetishism rather, is dying out. It required a great deal of persuasion to induce a family in a hut at Kong-a-nah to show us their household god; they appeared ashamed of it. We found the strange object of worship in a small, dark apartment, stuck in a corner against the mud wall. It looked like a stunted May-pole. On the top there was a single stag skull, while a garland of dried grass and flowers was twisted round the pole. A small jar of water was placed in front and at the foot of the pole. This constituted the goddess. Her spouse was represented on her left by what I took to be a child's chair, made of bamboo. There is, I believe, a priestess employed in the rites of worship, as is said to have been the case before the island was ceded to the Dutch, when the greatest sins of the aborigines are described as the wearing a silk dress at certain times, the building of houses, the collection of timber, or catching of oysters.* "Their religious services consisted then in two acts—in sacrificing and praying, which in their temples are performed by priestesses. They place their sacrifices before pigs' and stags' heads, which are set up in their temples for the purpose."†

LANGUAGE.

The following vocabularies were chiefly furnished by Dr. Maxwell and the Rev. Mr. Ritchie. They serve to show the striking affinity which exists between the dialects of the Pepohoans and tribes inhabiting the central mountain range and the Malay language, and their closer resemblance still with the languages of the Philippines, New Guinea, New Zealand, &c. For the purposes of this paper I will simply extract the numerals of one or two tribes, which, with slight differences, are common to the whole.

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* Without attention to the songs of the birds.

† A translation from 'Old Dutch Works,' by Rev. Whobscheid, pp. 9-10.

COMPARATIVE TABLE of the LANGUAGES of FORMOSA, the PHILIPPINES, SINGAPORE, NEW ZEALAND, ETC., ETC.

English.	Paichien. Formosa.	Sibucoon. Formosa.	Tibolah. Formosa.	Ranga. Formosa.	Bantanlang. Formosa.	Samobi. Formosa.	Baksa Pepohoan. Formosa.	Philippine. Jagulo.†	Philippine. Bisaya.†	New Zealand.‡	Des Habitans De Tikopa.§	Des Papous De Waigiou.	Tonga.	Mawi.	Des Harfoures§ De Manado. Célebes.	Malay of Singapore.
One	Saou	Tashang	Chum	Lenga	Denga	Itsa	Saat	Isa	Usa	Tahi	Tassa	Saï	Taha	Tahi	Essa	Satu
Two	Soo	Lusha	Lusa	Noosa	Noosa	Lusa	Duha	Dalana	Duha	Rua	Roua	Douï	Oua	Doua	Roua	Dua
Three	Tordò	Taoo	Tooloo	Tordò	Tordò	Toroo	Tmò	Tallo	Tatò	Toro	Torou	Kior	Tolou	Todou	Talou	Tigga
Four	Pati	P'at	Supat	Patù	Patù	Sipat	Da-pat	Apat	Upat	Wa	Fa	Fiak	Fa	Wa	Apat	Ampat
Five	Rimà	Timà	Limà	Limà	Limà	Limà	Da-lima	Limà	Limà	Rima	Lima	Rim	Nuna	Dima	Lima	Lima
Six	Neum	Noom	Nauma	Neuma	Neum	Unum	Danum	Anim	Uniam	Ono	Ono	Onem	Ono	Ono	Anam	Anam
Seven	Pitò	Pitò	Pitò	Pitò	Pitò	Pitò	Dapitò	Pitò	Pitò	Witu	Fitou	Fik	Fitou	Witou	Pitou	Tujo
Eight	Mivaroo	Awoo	Mevaroo	Mevaroo	Mevaroo	Aloo	Kulpat	Ualò	Ualò	Waru	Warou	War	Valou	Wadou	Walou	Dlapan
Nine	Siwà	Sivà	Chuga	Bangatò	Bangatu	Sivà		Siam	Siam	Iwa	Siva	Sion	Hiva	Iwa	Sio	Sumbilan
Ten	Koomath	Basau	Matl	Poorookoo	Poorooku	Poro	Kating	Sampu	Napulo	Nga-huru	Anhafouro	Somfour	Oulou	Nga Oudou	Poulou	Sapùlo
Hand*							Lima									•

* I have added the word Lima, or Hand in the Baksa dialect, in which it also means five. ("In many Negro languages Lima also means hand." See the late Mr. Crawford's "Dissertation on the Malay Language," &c., page 236.

† "Essays Ethnological and Linguistic," by the late James Kennedy, page 74.

‡ "Du Dialecte de Tahiti, de celui des îles Marquises, et en général, de la Langue Polynésienne," table, page 101.

§ "Voyage de L'Astrolabe," par M. D'Urville. Paris, 1834.

VII.—*Narrative of a Journey through Western Mongolia, July 1872 to January 1873.* By NEY ELIAS, Jun., Medallist R.G.S.

[*Read*, May 12th, 1873.]

ALMOST simultaneously with the date that enabled Europeans, under the provisions of the treaty of Tientsin, to travel in the interior of China and the Chinese possessions beyond the Great Wall, the uprising of the Mussulman populations closed these latter effectually to all intercourse from the north and east. Not only were European explorers unable to visit them undisguised and under the protection of Chinese passports, but the Roman Catholic missionaries, accustomed for years to live in the neighbouring provinces in the garb of the country, and knowing accurately the customs and language of the insurgents, have found it up to the present day utterly impossible to penetrate the country they hold, so great is their suspicion and hatred of all who approach them from the side of China, though towards the European, as such, they are probably not ill disposed. Our modern knowledge, then, of these countries is limited to the extreme west, where English travellers have penetrated from India to Kashgar and Koten, and the Russians to Ili and neighbouring portions of the Tian Shan ranges, leaving the whole of the intervening regions as described and mapped by ancient authors and the Jesuits of the last century, who, truthful and laborious though they generally were, had not at their command the means possessed by modern travellers for obtaining accurate geographical information. Thus the ranges of the Tian Shan and the countries to the north and south of them, formerly Chinese colonies, the great Southern Desert, with its buried cities and ancient roads, and also a great part of what Europeans call Zungaria, may all be looked upon as regions unexplored in the modern geographical sense.

In Mongolia, too, all to the westward of the well-known Peking and Kiachta road has remained unexamined, with the exception of the most north-westerly portion lying between the Russian Altais and the Chinese settlement of Uliassutai, which has been visited three times of late years by Russian expeditions with more or less geographical success, besides by Mr. Atkinson, who gives us but scanty information regarding the extensive tracts he wandered over.*

There was thus an enormous field open to geographical research in the summer of 1872, when I started from Peking on my late journey, and the only question was as to which portions

* See Appendix, under 'Former Explorations.'

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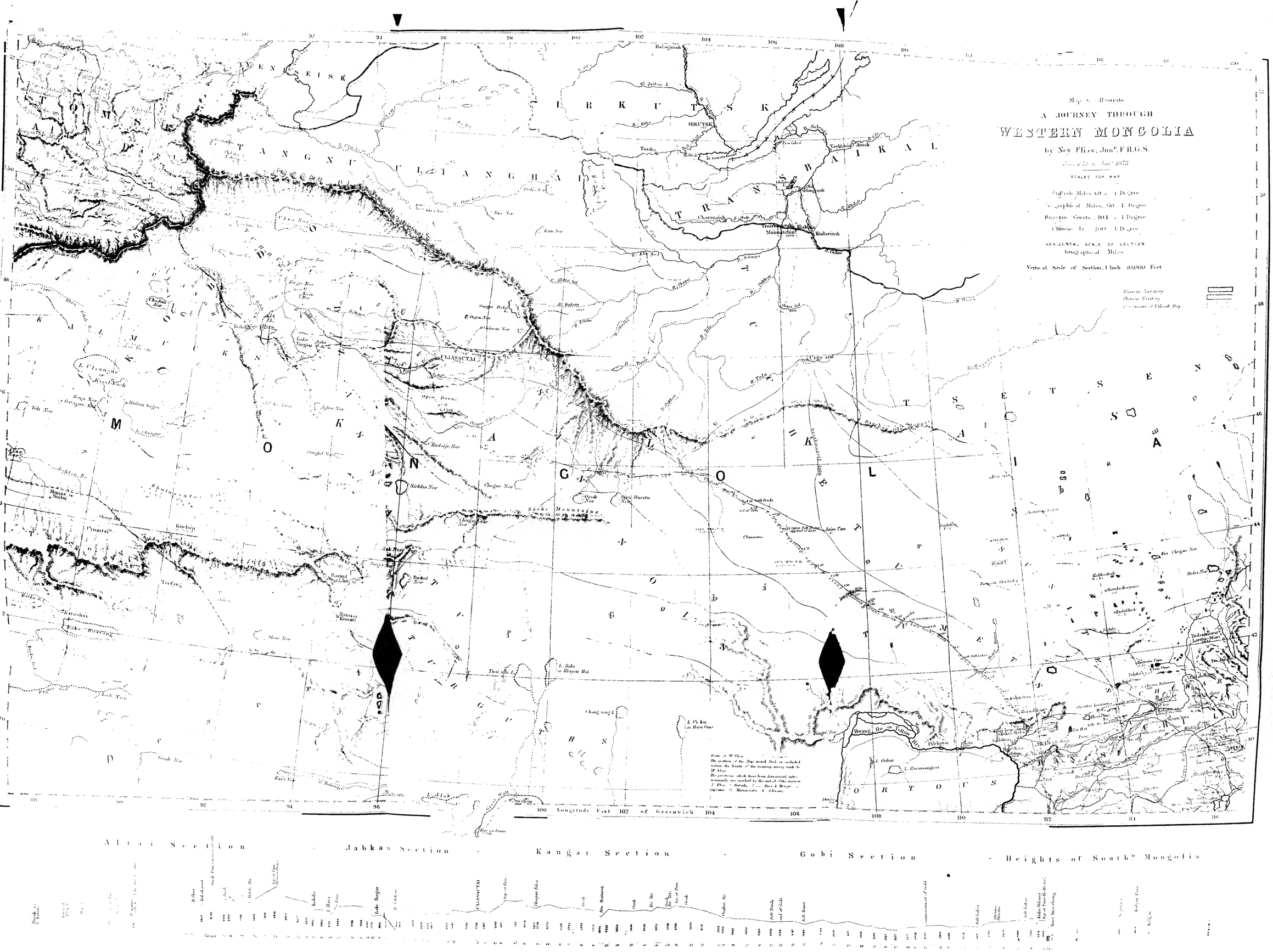

IRKUTSK
TRANS BAIKAL
TANGNU ULANGHAI
YENISEISK
TOMSK
MONGOLIA
KHALKA
ORTOUS
ULIASSUTAI
Kiakhta
Maimatchin
Sirke Mountains
Hwang Ho or Yellow Riv.
Tengri Nor
Longitude East 102 of Greenwich
Altai Section
Jabkan Section
Kangai Section
Gobi Section
Heights of Southn Mongolia

Map to illustrate

A JOURNEY THROUGH

WESTERN MONGOLIA

by Ney Elias, Junr. F.R.G.S.

July 1872 to June 1873

SCALES FOR MAP

English Miles 69.5 = 1 Degree

Geographical Miles, 60 = 1 Degree

Russian Versts, 104 = 1 Degree

Chinese Li = 200 = 1 Degree

HORIZONTAL SCALE OF SECTION

Geographical Miles

Vertical Scale of Section, 1 Inch = 10,000 Feet

Russian Territory	▭
Chinese Territory	▭
Dominions of Yakoob Beg	╌

Route of Mr Elias

The portion of the Map tinted Pink is included within the limits of the running survey made by Mr Elias

The positions which have been determined astronomically are marked by the initial of the observer F. Elias, F. Fritsche, F.B. Fuss & Bunge, L. Lepinner, M. Matussowski, S. Schwarz

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hood of their destination is free from the rebels, recrossing the Gobi to Barkul. The ordinary time occupied in this journey is about 83 days from Kuei-Hwa-chêng for loaded camels, or some 50 days for officials on horseback.

Before my departure from Peking I well knew that not only was the old Kansu route entirely closed, but, even that if I succeeded by one of the others in reaching Barkul, that the journey thence to Kulja would, under ordinary circumstances, be impossible, for all the intermediate country was positively said to be in the hands of the Mahomedans. I had heard, however, on trustworthy authority that a Russian caravan, under a formidable military convoy, was to proceed during the summer from Kulja to Urumtsi* and attempt to open a trade with the Tungani inhabitants there, and I conjectured that the presence of a powerful Russian party at this central point might enable a traveller by one road or another to reach that place from Barkul; and if not at Kuei-Hwa-chêng, certainly at Uliassutai I expected to hear news of its arrival and to be able to ascertain, with some certainty, what would be the chances of success in attempting to join it.

With these prospects, then, I started from Peking on the 22nd July, and proceeded to Kalgan, with a view of obtaining camels there by contract for the whole journey, or, failing in this, by purchasing them and getting, if possible, a driver known to, and recommended by, the Fathers of the Belgian Mission near that place, to take charge of them. In both of these arrangements, however, I was unsuccessful, in spite of all the hearty assistance these hospitable missionaries could render me; and on the 1st August I left Kalgan to make a further attempt to obtain baggage animals at another station of the same mission, called Si-ying-sze, situated upon the table-land at about a distance of 70 miles in a W.N.W. direction. At this station I remained about a week, Mr. De Vos, the resident missionary, [illegible]dly aiding me in making every possible attempt to procure [illegible]mals and a driver from the neighbouring Mongols, but without [illegible]cess; no one of them had ever been further to the westward [illegible]n Urga, and all feared, or affected to fear, travelling amongst [illegible]es whose language or customs differed in any degree from [illegible]ir own.

The position of Si-ying-sze was approximately determined [illegible] a French traveller from Peking to lie in lat. 41° 03′ 31″, [illegible]g. 114° 03′ 00″, and is distant from the great Chorchin Lama-

48

This turned out to be the so-called "Morozow" caravan. It did not, however, [illegible]t from Kulja, but from Semipolatinsk, and proceeded, by way of Lake Zaisan [illegible] the Upper Irtish, to Uliassutai and Barkul, where it was unsuccessful in [illegible]ning the trade.

sery, mentioned by the Abbé Huc, about 10 miles in an easterly direction. This lamasery I had an opportunity of visiting during my stay at Si-ying-sze. It consists of a temple in the usual Chinese style, surrounded by little, regularly-built streets of small houses, each in its own court-yard and each inhabited by one of the resident lamas, who in summer occupies the house and in winter pitches his yourt in the court-yard and lives in it, using the house as a store or shed. There is no town or even village at Chorchin—nothing but the lamasery, built in a perfect square on the bare downs. The number of resident lamas at the present day varies from 200 to 400, and, judging from the size of the place, it cannot possibly accommodate 2000, as it is said to have done in the days of Huc. It forms a fair example of all the larger class of lamasery in Southern Mongolia, and differs only from those in the north in being built of brick and tiles, instead of wood and plastered clay.

The territory allotted by Rome to the Belgian mission extends from Kuantung, near Jehol, in the east, to the neighbourhood of Kuei-Hwa-chêng in the west, and consists chiefly of the narrow belt of Mongolia lying immediately outside the Great Wall, where the population is made up almost entirely of Chinese emigrants from the neighbouring provinces of Chili and Shansi, who cultivate the ground and build houses or excavate caves, as in their native provinces, and have nothing whatever in common with the Mongols, who, though frequently standing in the relationship of landlords to the much-despised Chinese agriculturists, invariably pitch their camps on uncultivated land and breed their horses and sheep beyond the reach of Chinese "civilisation." And besides this separation of mere residence, it is curious to note how the nomadic natives of the soil have been, and are still, receding before the steady advance of the settled and industrial Chinese. The old border, the Great Wall, has been long overstepped; a more recent one, consisting of a roadway leading from east to west, almost parallel to the wall, and part of which I followed on the way to Kuei-Hwa-chêng, is now [illegible] some places many miles within the settled region, and thou[illegible] the nomad is to a great extent dependent on the settler for [illegible] necessaries of life, and is consequently brought into frequ[illegible] contact with him, yet no assimilation is observable in the e[illegible] nomical condition of the two races—no intermarriage, no mo[illegible] fication of manners, customs, or language; facts sufficien[illegible] remarkable in themselves, but the more so when we consid[illegible] how great is the power usually displayed by the Chinese [illegible] absorbing the little cultivated nations on their borders, as, [illegible] example, in the neighbouring country of Manchuria, where t[illegible] process has been going on both rapidly and steadily for ma[illegible]

years, in spite of the Manchoo being the conquering, and the Chinese the conquered, race, and that a Manchoo Emperor, surrounded by his national court, sits on the throne of Peking.

The agriculture in these settled districts consists mainly of wheat, oats, millet, and poppy, the facilities for the cultivation of the latter being the chief inducement to immigrants. Indeed, in some of the villages, where men, women, and half-grown children are all smokers, I was given to understand by many of the inhabitants that their reason for leaving their native province, where opium and land were dear, was in order that they might cultivate sufficient for their individual smoking and be independent of extortionate shopkeepers. It was impossible, during a mere passage through the country, to obtain any trustworthy figures regarding production or consumption, though it is said to be consumed entirely in the neighbourhoods in which it is grown and unmixed with the foreign drug, the price being generally reckoned at 300 or 350 *cash* per *tael*, or say 11*d.* per ounce. The tax which the growers pay to the Shansi authorities for disobeying the law against the cultivation of poppy is, for land of an average yield, 1000 *cash* per *mow** a month, and for poorer farms or more recently settled land, somewhat less. It is admitted on all hands that opium-growing is the most profitable trade in Mongolia, and that, in spite of the taxation and occasional bad years, it continues to repay the growers handsomely. It appears, too, that an increased supply in no way affects the general profits, for the greater the quantity cultivated the greater the number of growers and boilers, and as all, together with their families, are smokers, supply and demand continue to balance.

Having failed thus far in procuring animals and guides, it was necessary to continue my westerly journey to the great border town of Kuei-Hwa-chêng, distant from Si-ying-sze about 150 miles, and which I afterwards learned was the only terminus for the Uliassutai and Tian Shan trades, as Kalgan is for the trade of Urga and Kiachta. The road to it from Si-ying-sze [illegible]ds over an elevated and somewhat mountainous grass land [illegible]il within about 40 miles of the town, when, after crossing a [illegible]s some 5800 feet high, through confused masses or groups of [illegible]ls, a descent takes place into the head of a valley formed [illegible] a bifurcation of the elevated mass into two distinct ridges, [illegible]e trending towards the west and the other towards the [illegible]th-west. On arriving in this valley, which slopes gently [illegible]wn towards the Yellow River, the soil is found to be a species [illegible] loam or "loess," light and friable, of a yellowish-brown colour

* About 26*s.* an acre.

and full of rifts and fissures, sometimes 30 feet or more in depth, the hills on each side being to a great extent composed of the same material, and containing in their sides whole villages of cave-houses, in which dwell the owners and cultivators of the adjacent land. These cave-dwellings were met with in the "loess" cliffs of Honan and Southern Shansi by Baron von Richthofen in 1870, who describes the inhabitants of some of the most fertile valleys of these provinces swarming in their hill-side caves like bees in a hive. Some of these dwellings are large and commodious enough, and are said to be warmer than houses in winter, but they are extremely unhealthy and even unsafe, especially in wet weather, when it is not an uncommon occurrence for the whole face of the cave to be dissolved and washed away. Those of the better class are composed sometimes of several rooms, and are plastered on the inside with a kind of cement; they are fitted with doors, and the usual Chinese window, consisting of a wooden grating covered with paper.

Kuei-Hwa-chêng was reached on the 17th August, and it was not until the 8th September that I could succeed in contracting for animals and that all could be got in readiness for a start towards the desert. I will not weary my listeners with an account of how those three weeks were spent, with details of the obstruction, deception, and trickery it was necessary to wade through, and the never-ceasing watchfulness of wily and obtrusive spies it became a daily occupation to elude, ere I could succeed in making people believe I had no evil intentions and no secret understandings with the Mahomedans. The popular suspicion ran chiefly on the contents of my packages and on my observing work at night, which latter they had learned in some way or other to connect with map-making, a pursuit they appear to have an intense jealousy of in these regions, unlike in any other part of China that I have visited, where usually no especial hostility is evinced towards this, more than towards any other unaccountable proceeding of the foreigner. Kuei-Hwa-chêng consists of two separate cities, the old one situated in the midst of the great open trading town, and the new one occupied entirely by the military and standing among the fields about a mile and a half to the eastward. In the latter lives the Kiang-Chün, or military governor of the two cities and of the adjoining Mongolian districts, whilst the Foo, or civil governor, resides in the old city. There is, by comparison, a large export trade at Kuei-Hwa-chêng in tea, flour, millet, and all manufactured articles used by the Mongols, such as cotton-cloth, knives, saddles, pipes, &c., and from Mongolia are brought live stock and skins, in what I conceive to be of about equal

value, for as the Mongols have but little silver amongst them, the trade is almost entirely one of barter.

A small stream flows from the head of the valley above described past the neighbourhood of the town and falls into the Yellow River near Toto Chêng. This, however, is quite unnavigable even for small boats above 10 or 15 miles from its mouth, so that there is no water-communication with Kuei-Hwa-chêng in this or any other direction. The chief characteristic of the old city and open quarter, as well also to a great extent of its inhabitants, is its Western-Asiatic air, and this is not only noticeable amongst the Mahomedan population and their mosques and dwellings, but it pervades as a general characteristic the whole town. Nor is it surprising that this should be the case, as for hundreds of years it has been the eastern gate of the desert, as Kia-Yü-Kuan was the western one—caravans from the western Mahomedan nations coming and going, and leaving here traces of those distinctive peculiarities of their countries which form the marked contrast to neighbouring portions of China at present observable, and which a further passage into the country would have easily destroyed. A large proportion of the inhabitants, including many of the most influential towns-people, is still Mahomedan, and though a Mahomedan war of extermination is supposed to be raging in the neighbouring province of Kansu, no animosity is shown towards these people here, and they appear to be just as loyal and peaceable Chinamen as the rest of their fellow-citizens. One constantly sees amongst them men whose type of physiognomy stamps them as of undoubted Western origin, though in language, as to all other intents and purposes, they are Chinamen, in every sense identical with the Dungens or Tunganis* of the Tian Shan settlements. Few profess to come from further west than Urumtsi or Kulja, though I believe the original contact of races to have occurred chiefly in Eastern Turkestan and Kokand, and in the Chantu † provinces on the south of the Tian Shan. This conjecture, too, borne out not only by history, but by the style of architecture oticeable at this very place, for in a large proportion of the uildings it differs from anything generally seen in the interior of hina, inasmuch as instead of the open wooden front, the houses re built all round of stone or clay bricks, having narrow doors

* This name is never used, so far as I am aware, by either Chinese, Mongols, almucks, or Kirghis; certainly I have never found a person of any one of these aces to recognise it, however pronounced. We are, however, thoroughly enghtened as to its meaning, for according to the late Mr. J. W. S. Wyllie it ignifies "Remnant;" according to Mr. Vambéry. "Convert:" and according to Mr. T. F. Wade, "Military Colonist."

† The inhabitants of the States on the south of the Tian Shan, and their language, are called by the Chinese "Chantu."

and long slits for windows placed high up from the ground, whilst the roof, instead of being of the usual form—high pitched, and of tiles—is flat and surrounded by a low castellated parapet. Most of such buildings are in court-yards, though this is not always the case, but when it is so there are generally little gardens of creepers and flowers in pots before the entrance to the chief buildings, which at first sight suggests the possibility of confirming the identification of the place with Rashid-Uddin's town, as quoted by Colonel Yule, to the west or north-west of Peking, "where the inhabitants have planted a number of gardens in the Samarcand style." * The name of "Tenduc," or "Tanduc," or any approximation to it, none of my interlocutors could recognize, though in two cases these were men who knew something of the history of the place.

When, after a stay of over a fortnight in Kuei-Hwa-chêng, an agreement for camels was concluded, and there remained only the necessity of waiting for a lucky day in the Chinese calendar on which to start, I took the opportunity to make a flying visit to the nearest point of the Yellow River, which is at the little port of Hokou, only 2 miles from Toto Chêng, the latter place being distant about 50 miles in a south-south-westerly direction from Kuei-Hwa-chêng. The country over the whole distance is a plain, sloping very gradually towards the river-bed, which is there, of course, of a natural formation and unembanked. I arrived at Hokou on the evening of the 2nd September, and having caused one of the aneroids left at Kuei-Hwa-chêng to be marked at 5 P.M. (the time I expected to reach, and actually did reach, the river), I have, I think, a fair approximation of the difference in altitude of the two places, viz., about 240 feet, making 3270 feet for the Yellow River at Hokou above sea-level. The fall per mile between this point and its entry on the great eastern plain of China may now, therefore, be approximately arrived at, for in 1868 I found the level of the diverging point of the old and new beds at Lung-mên-Kou to be about equal with that of the sea; thus the whole of the above difference is contained within the space of some 800 geographical miles, showing a fall per mile of over 4 feet. I was unable, on account of the wide mud banks at Hokou, to get close to the water's-edge, and therefore can form no estimate

* I only mention the existence of these gardens (which I know of, in a similar form, in no other part of China) in connection with Colonel Yule's quotation ('Marco Polo,' vol. i. p. 255), as a mere suggestion; for, in the first place, it is not a sufficiently characteristic fact on which to base the identification; and, secondly, though I believe, from my Chinese informants, that it is a *Western* style of garden, yet I have no means of ascertaining if it is the Samarkand style, or if that style exists now in the same form as in the days of Rashid-Uddin; a Barkul or Urumtsi style would, with equal aptness, be called "*Western*."

of the velocity at that point; it must, however, be very considerable, even at this date, judging from what I could discern at a short distance of the current in a cut-off or loop to the north of the main stream. In the height of the flood season, with its volume increased to its greatest proportion, and with the whole of the above fall taking place before reaching the great plain, some 400 geographical miles above its mouth, the velocity with which its waters were propelled down the old artificially embanked channel that conducted them to the sea must have been one requiring the greatest skill and vigilance to control, allowing little room for surprise at the constantly recurring calamities recorded in Chinese history, and the ruin and devastation caused by them in consequence of the deficient engineering knowledge and appliances at the command of the rulers of the country.

Both Toto and Hokou are busy little towns, and I saw a great deal of coal, especially at the latter place, mostly in very large blocks, and of a hard, slaty nature, which is said to be mined in the hills some 300 li to the north-west. The navigation of the Yellow River is almost entirely down stream in flimsy, square, flat-bottomed boats or lighters, which are intended only to drift with the current and to be broken up at the end of the voyage. These boats are to be seen as low down as the Grand Canal and the neighbourhood of Tsinan-foo in Shantung. The people here, as at Kuei-Hwa-chêng, were exceedingly suspicious of map-making, and I had not arrived in the town half-an-hour before the Foo of Toto sent to ask if that was my object in visiting the place.

A point of some interest in the neighbourhood of this place is an ancient earthen wall of great height and thickness enclosing a square site of what was once in all probability the old city of Toto, though possibly only a fortified granary or place of refuge. It stands about 3 miles from the present town of Toto, on the road to Kuei-Hwa-chêng, and being some 40 or 50 feet in height, forms a striking feature in the neighourhood. My short absence from Kuei-Hwa-chêng, however, afforded no opportunity of examining it, nor could I obtain any information regarding it worth recording from the natives. In Duhalde's version of Gerbillon's sixth journey into Tartary we are told of a ruin, precisely at this point, of a town called Toto, though he also mentions Toto afterwards as a separate place but in the close vicinity. If, then, there were two, the present Toto was at that time some 400 years old, and the ruins probably of much greater age, though, it must be confessed, there is an appearance of confusion in the story as we find it.*

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* 22*nd November*, 1696.—"Nous vînmes camper sur le bord du Hoangho en

At length the lucky day, the 6th of the eighth moon (8th September), having come round, my little party was in readiness and a start was effected towards the evening, a march of 6 miles in a N.N.W. direction, bringing us to a small village at the foot of the heights which bounds the Kuei-Hwa-chêng plateau on the north. Here it was necessary to remain over nearly the whole of the next day to complete certain final arrangements regarding the camels, and it was not until the third day that the pass was crossed at an elevation of 5050 above the level of the sea, and that, after descending rapidly some 800 feet into a narrow valley or gorge, and again gradually ascending the bed of a mountain-torrent, that the open, down-like country of the true Mongolian steppe was reached at a small village near the Chinese settlement of Ku-ku Illikung, the last of all the settled communities towards the desert. There are two tracks from here to Uliassutai, as there are also two from Kalgan to Urga, viz., an official track, or "Tai-lu"* as it is called by the Chinese, and a caravan track. The former is used by all Government officials and soldiers, and consists of a string of Mongol villages or "stations" subsidised by the Chinese Government to remain at certain positions along the route, and to have constantly at hand a certain number of camels and ponies ready to meet the requirements of whatever officials or soldiers may present themselves at any time of the day or night provided with the proper order for official transport. The subsidy is paid to the station-holders, in most cases I believe, yearly by the military governor of the border town or settlement in whose district the station lies, and it covers not only the expense of animals and drivers or guides, but also of the food supplied to the passengers while at the station, viz., a leg of mutton or its equivalent from other parts of the sheep for each traveller at each station, and a sufficient quantity of water for cooking and drinking. By this mode of travelling as

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un lieu nommé Houtan Hojo. . . . A dix lys du lieu où nous campâmes nous trouvâmes les restes d'une ville assez grande nommée Toto dont l'enceinte, qui est de terre, subsiste encore; mais il n'y a dedans que fort peu d'habitations. On y avait fait un magazin de riz qui en contenait plus de dix mille *Tans*." [A Tan is 133⅓ lb. avd.]

29*th November.*—On leaving the camp of the 22nd they commenced ascending the Yellow River, and "Après avoir fait environ quinze ou vingt lys, nous passâmes la petite rivière de Tourghen, qui se jette proche de là dans le Hoangho. Elle coule au pied de la ville de Toto, près de laquelle nous passâmes. Cette ville est quarré comme celles de la Chine; ses murailles ne sont que de terre, mais d'une terre si bien battue qu'elle ne s'est eboullée nulle part depuis trois ou quatre cent ans, et plus, qu'elle est bâtie."

* The word might be translated "station road," or "post road;" but as "road" in any sense, and more especially "post" road, gives an incorrect idea of the institution as it actually exists, I prefer to call it "official" track, in contradistinction to "caravan" track or "mai-mai-lu."

much as three marches or stages per day are frequently made good by officials on horseback and two by loaded camels, each stage averaging about 16 geographical miles, though some are nearly double the length of others.

The stations, being merely encampments or villages of yourts, are, of course, easily moved, and the great difficulty the Government has to contend with in maintaining the institution in working order is that of preventing the Mongol owner from changing his position; but, in spite of all efforts, it is constantly done, and much time is frequently lost by the travellers in searching for the stations.

The caravan track consists of nothing but a line of camel and pony footprints, leading through the best grazing-grounds of the neighbourhood and the most easily-traversed passes, and consequently also past the wells or water-holes of the Mongols, for though often nothing is seen of their encampment for several days at a stretch, yet these are never far distant from the wells; thus it may be described as a track connecting a series of Mongol encampments, near which pasture and water are usually to be found, but it can in no sense be called a road. In the case of Uliassutai this track lies considerably to the west of the official or "tai-lu," and it being my object to cross the desert as far to the westward as possible, I followed it in preference to the latter.

My party consisted of three besides myself, viz., my servant, a native of Shanghai; a camel-driver from Kuchên, near Urumtsi, who acted the part of owner, and was responsible for the contract as well as for the animals; and a native of Shansi, who had lived for some years in Kobdo, and was said to have been eight times across the desert, who joined as guide and interpreter. The baggage animals consisted of three good caravan bull-camels and four very inferior cows, one or two of which were always very lightly loaded in order that they might be ridden by the men. Besides these seven hired camels I had always two ponies of my own for myself and servant to ride, and which I changed with the Mongols from time to time during the journey, as they became knocked up, giving some tea, flour, or silver in addition for a fresh animal, for no money is current in the country. The usual order of travelling was to break camp at eleven in the morning, and, after spending about an hour in saddling and loading, to start finally about noon, and, with the exception of a halt for watering purposes where and whenever it was found most convenient, to continue the march until about ten at night. In this way during the first few weeks of the journey an average of about 18 geographical miles a day was made good, though later on, when the camels became poor

and weak, this average was reduced to 15 miles. The reason for starting so late in the day is in order to secure time during daylight for the camels to feed, for, besides the difficulty of watching them whilst grazing at night, it is a peculiarity of the Mongolian camel not to be able to feed satisfactorily except during daylight, and by adopting the above order of marching, he is turned loose at dawn and easily watched whilst grazing until the time of breaking camp.

It would be tedious as well as uninteresting in the extreme to give a daily account of a journey through a country possessed of so little variety of scene or geographical features, and of so little change of incident as these Mongolian steppes present. I shall proceed therefore to quote from my journal at moderate intervals.

Wednesday, 18th Sept.—Since leaving our encampment at the three little salt lakes on the 12th instant, we have been travelling on steadily but slowly . . . . through an open grass country with low hills here and there. The grass, however, is very sparse, and in many places there are patches of sand or beds of rocks cropping up, so that grazing ground for the animals is not always easily found. We see very little of even the few Mongols whose settlements we pass, though my guide speaks the language very fluently, and seems to be well acquainted with all their peculiar manners and customs. Thus far they are all of the Toumet tribe; they appear to be much poorer and more squalid in their habitations than those seen between Kalgan and Kuei-Hwa-chêng, who are chiefly Chahars or Sunites, yet they are tolerably civil and well disposed. Their property mainly consists of small flocks of sheep and goats and of camels, horses and cattle being comparatively rare. We frequently meet large flocks of sheep, some of them numbering 6000 or 7000, and mobs of ponies, with as many as 500 or 600 in a mob, on their way from the Kobdo and Uliassutai districts to Kuei-Hwa-chêng; these are the property of Chinese merchants of the latter place, whose agents collect them during the winter by bartering tea, cotton-cloth, &c., against them, and in the spring they commence their march across the desert in charge of Chinese drivers and shepherds, the sheep requiring usually six to seven months from Kobdo and the ponies three to four. On the afternoon of the 14th, in about lat. 42° 0′ and long. 110° 40′, we passed, at a distance of about 3 miles, the ruined wall of a Chinese town, the name of which I have been as yet unable to arrive at.* On the same day also, though some hours earlier,

* On Moyriac de Mailla's map of Tartary ('Hist. Générale de la Chine,' vol. 10. Paris, 1779), some ruins are shown in about lat. 42° 29′ and long. 111° 28′, together with a small river flowing past them in a direction nearly E. by N. No name is given to the ruins, but that of "Sira Moren" is marked against the river.

a blocked-up well was met with, surrounded by a stone-coping and troughs, near which were lying about some cylindrical blocks of stone in shape like the Tibetan prayer-wheel, and having what I take to be Tibetan or Baspa-Mongol characters carved on them in low relief. I have been able to collect a few specimens of the prevailing rocks* with which the ground is in most places covered, and regret to be unable to do the same with the plants, which appear to be full of interest. All the smaller rocks and stones, especially in the most desert tracts, have a worn and polished look, and glisten in the sunshine like burnished metal.

Tuesday, 24th Sept.—We have now been for several days in the true desert, or Gobi, as it is called by both Chinese and Mongols. The aspect of the country is that of low hills or downs, with valleys and plains intervening, the whole of a rocky or stony nature rather thau sandy, though patches of sand do occur every here and there. What little vegetation exists is chiefly composed of weeds, "scrub," and heath, there being scarcely any grass and only a dwarfed and stunted tree here and there in the gorges or passes of those low rocky ranges that, at uncertain intervals, cross the desert in almost parallel lines from east to west. The "scrub" makes tolerably good pasture for camels, but ponies fare badly. . . . . The only game seen has been an occasional hare and a few herds of "huang yang," or yellow goats. I succeeded in bagging one of the latter to-day at 200 yards; he was a buck, with horns about 8 iuches long and lyre-shaped, like those of the lyre antelope depicted in Mr. Shaw's 'High Tartary.'† Though the head is somewhat that of a sheep or goat, the body and horns stamp it at once as some species of antelope; and certainly "antelope" conveys a much more accurate general idea of the animal than the Chinese name of "goat" or "sheep." The Mongols, I am informed, hunt them during the winter by digging a line of pits, in which they sit with their guns whilst a mounted party surrounds a herd and drives it across the line. . . . . I find the situations of the Mongol villages or encampments we pass are so often changed that I have given up recording them with the dead-reckoning as a means of avoiding confusion in the future. The whole of one of these places is frequently carried off on the backs of a few camels and put down under the same name at some other spot, where either pasture or water offers some advantage. Then, again, two

* See Appendix, for "List of Specimens," kindly described by Mr. James Tennant.

† It is not, however, the lyre antelope, but the *Antilope gutturosa*, subgenus *Procapra*, as I am informed by Mr. Blyth, the eminent naturalist.

persons seldom agree as to the name of any place: thus, yesterday I received five different names for one of them—two Chinese and three Mongolian—from as many different informants.

The so-called wells are often little better than holes or pools of water, and it frequently happens that we arrive at one after a flock of sheep or a mob of ponies has been watering there and drunk it dry; in which case the only alternatives are to make a forced march towards the next or to camp and wait for the water to collect again. The best wells are always to be found in or near the rocky transverse ranges of hills mentioned above, the water in them always being sweet, whilst in those on the plains it is frequently somewhat brackish.

Monday, 30th Sept.—We continue to advance at the rate of about 18 geographical miles a day, every now and then falling in with a caravan of Chinese camels returning, without merchandise, from Kobdo or Uliassutai, all having been bartered against sheep and ponies, numbers of which, chiefly from Kobdo direct, we still frequently meet. These caravan people all tell us of Russian traders at Uliassutai and Kobdo, but none seem to know anything about the state of affairs in the Tian Shan districts, and have never heard of the arrival of Russians at Urumtsi. The traverse or dead-reckoning, checked as it is every few days by an observation for latitude, continues satisfactory, and I meet with no obstruction of any kind in work of this nature from the Mongols.

. . . . Neither of my men know the country, and we have great trouble in finding grass and water; also at night, if there be no moon, the "guide" coolly requests me to keep the track for the camels. The camel-driver is not supposed to know the road, but the other joined as guide, and is more or less of an impostor. . . . . The fine autumn weather broke up on the 20th, since when it has been generally cold and blowy. On the 27th, with a strong north-wester but bright sun, there was ice of half an inch in thickness at 10 in the morning.

Thursday, 10th October.—On the morning of the 8th we arrived at the river Onghin, and remained there over the whole of yesterday in order to obtain an observation for the longitude, which I was able to do pretty successfully by a set of lunar distances east and west. This will be an improvement on the dead-reckoning longitude, though it would have been preferable to have waited for an occultation at so important a position, but none can take place for several days, and the season is so far advanced that every week's delay makes an important difference, for in the most favourable case we cannot even now expect to reach Kulja until late in December.

Some 10 miles before arriving at the river our road joined the "tai-lu," or official track, from China to Uliassutai, *viâ* Zaire Ussu, and my observation-point on the river is scarcely half a mile above, or to the north-west of, the crossing. The direction of the Onghin for the 7 or 8 miles that I have been able to see is from north-west to south-east, and the natives assert that it continues to flow in the latter direction for a distance equal to about 80 miles. It there loses itself in the desert near a lamasery called Ulansomo, but it does not form a lake. The source, they say, is towards the north-west, but I cannot arrive at any satisfactory estimate of its distance. All the Mongols I caused to be questioned on the subject of the river declared that in no part of its course does it reach to anywhere near Zaire Ussu (as shown in some modern maps), which is, indeed, manifest from our having passed to the westward of that place, and never nearer to it than about 200 li (60 miles), and yet have never come upon the river until now.

The altitude of the Onghin at this point is 4740 feet above the sea; it winds through a flat valley in several branches or loops, and with a current, at this season of 3 to 4 miles an hour. The bed is a loose shingle of chalcedony, and the water clear and sweet, though a good deal of efflorescent salt is observable in the soil of the valley. Thus far all my inquiries regarding Karakorum, and they had been made at every opportunity and in every imaginable form, had proved fruitless —nobody had any idea of ruins existing either on the Onghin or the Orkhon, though I was now told of an ancient city on the banks of the Tui, distant only a few days' journey towards the west, and which I determined to visit on the way to Uliassutai, though had I then known the impossibility of its being the remains of Karakorum, I should certainly have made an effort to visit the Upper Orkhon instead.* With respect to

* The balance of evidence is so overwhelmingly in favour of the site of these ruins (if in existence) being on or near the Upper Orkhon, that, in the absence of direct proof to the contrary, no other can be assumed (see chiefly Abel Rémusat in 'Mémoires de l'Académie des Inscriptions et Belles-Lettres,' vol. vii. Paris, 1825; article 'Recherches sur la Ville de Karakorum, &c.'; and Ritter, in 'Erdkunde von Asien,' vol. ii. p. 556 *et seq.*). As regards the name, the only suggestion I would make is that our *Korum* has a great resemblance to the Mongol word *Kuren*, meaning an "enclosure" or an "encampment walled round," or sometimes a "camel pen," and is used in these senses in common parlance, not only by the Mongols, but by the Mongolian and Tian Shan Chinese, who have adopted it, and who pronounce it *Kulun* or *Hulun*. The native name for Urga, as is well known, is *Ta Kuren*, or "great walled encampment," and it would not be surprising to find the earlier Mongols giving a similar name to their capital, which, undoubtedly, was enclosed by a wall (see Rubruquis) unlike their ordinary encampments, and therefore sufficiently remarkable for the name itself to contain a record of the fact. The *K* of *Kuren* being pronounced *H* by the Kalkas, and possibly by other tribes also, would leave a word having as much

the position of the latter but little could be elicited here; from my camp in lat. 45° 54′ 29′ and long. 103° 29′, the hills forming the eastern continuation of the Kangais, and which I believe constitute the watershed between the two rivers, were distinctly visible at a distance of about 16 to 20 geographical miles, extending from about N.W. to N.N.E.; and the direction of the Orkhon, pointed out by the natives, was approximately N.N.W.; but the distance was a subject of the usual vague statements, such as "not far," "two or three days' ride," "a few marches," &c.

Until arriving at the Onghin our general course had been to the north-west, but after passing the river the track leads on in a westerly direction along the southern slopes of the rugged Kangai Mountains, and across most of the streams they send forth towards the south, to be absorbed, after a short course, by the thirsty desert. The formation of these ranges, or masses of mountains as they appear rather to be, is chiefly red granite, though in some places grey is met with, whilst the beds of the rivers are mainly composed of loose pebbles of chalcedony, like the Onghin.

On the night of the 11th, the day after leaving the Onghin, I had the misfortune to lose my guide and interpreter, who contrived most cleverly to get away during the night unperceived, taking with him our strongest and freshest camel, about a hundredweight and a half of flour and millet, and—what was of greater consequence than either—leaving me for language dependent on the Kuchên camel-driver, who could speak only a few words of the most broken Mongol. Our strange-looking party of four had from the first excited much suspicion amongst the miserable Mongols, though we had, then at least, command of sufficient language to give a satisfactory account of ourselves; but in our present plight few would have a word to say to us, much less would any one venture to join such a vagabond party as guide. Thus it became necessary to find my own way to Uliassutai, a distance of nearly 400 geographical miles, and take water and grass whenever I happened to find it. A homeward-bound Chinese caravan was occasionally met with, and from these some information was usually obtained, though on the whole to travel in such a country without guide or competent interpreter is an uncertain and anxious pursuit. In some places

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affinity to the Chinese *Ho-Lin* (meaning fire-grove, or wood) as either the "*Horin*" (mountain) of Sir Henry Rawlinson (see 'Royal Geo. Soc. Proceedings,' vol. xvii. No. iii. p. 192) or the *Korum* (gravel) of Captain Strachey (see 'Royal Geo. Soc. Journal,' vol. xxiii. p. 26), and a much greater affinity than many Chinese names have to those in use amongst the natives of the soil. Colonel Yule informs me that "the greater number of MSS. of Marco Polo have Caracoron with an *n*;" and further remarks, "The Chinese *Holin* certainly points rather to *Kuren* than *Korúm*."

the ill-will of the natives was shown in so decided a manner that it was only by a constant parade of arms and the most careful vigilance by day and night that a collision with them was avoided.

On the evening of the 14th October the River Tatz was crossed, and on the 16th the Tui. The former is a small mountain stream issuing from a rugged part of the Kangai, and only some 30 yards broad and a foot deep where we passed it. The latter has much the same characteristics as the Onghin, viz., a broad, marshy-looking valley intersected by several branches or loops and having a bed of similar formation. Within a mile of the right bank of the Tui, and close to the track we were following, I found the ruins of the ancient city or fortress about which I had heard whilst camped on the Onghin. I hardly know whether to call it a "city" in the Chinese sense or a fortress, for it is too small for the former and scarcely of the build of the latter. It consists of a mud-brick wall and moat (now dry), and is, as nearly as could be estimated, square, each side being about 250 yards; has two gates, one north and the other south, and four bastions, one at each angle; the gates are like those of all Chinese cities, forming on the inside a sloping way on to the top of the wall. Inside the enclosure are the remains of several buildings, all made of mud bricks mixed with small stones, like the outer wall; one of them, which had apparently been a Yamên or temple, measured nearly 100 yards long and 40 or 50 broad, and was divided into several yards or courts. I could discover no stonework, or tablets, or inscriptions of any sort, either inside or outside the wall. This ruin, as I afterwards determined by inquiry at Uliassutai and Kobdo, is that of a settlement and trading town of the Chinese, which existed up to eighty or ninety years ago, when the difficulty of obtaining fuel became so great that it was gradually abandoned, and from it sprang the present Uliassutai and Kobdo. The name was a puzzle to the most intelligent of my informants, but from its position on the Tui it would seem to correspond with the Pojihojo of Duhalde or the Pu-li-yai-chê-shê of the Chinese maps, though the former only calls it a "Kiamen," or station of yourts, and makes no mention of a town there or even a fort. For many reasons it cannot be Kara-korum.

After ascending from the valley of the Tui and continuing our westerly course for about a distance of 85 miles, the River Baitarik was struck, on the 20th October, in lat. 46° 6′. This is the largest and most powerful of the Kangai streams, being 60 or 70 yards broad where we passed it, and more than 2 feet deep in many places, whilst in summer, as the banks plainly indicate, it reaches to more than three times its present dimen-

sions; the water is clear and sweet and the current very swift, its general direction being from north to south. The country for several days' journey, both to the east and west of the Baitarik, is extremely rugged and barren, and it is here that are chiefly to be found the wild ponies and asses of Mongolia. The former go in large mobs, and are sometimes hunted by the natives on horseback and sometimes caught in pits made for the purpose near their watering-places. The asses are somewhat rarer than the ponies, but though they are excessively wild, I was fortunate enough to obtain a view of some of them from about a distance of 300 yards; they had in every respect more the appearance of mules than of asses, and it is by this name only that they are known to the Chinese, in spite of the fact that they propagate their kind. Their colour is a light dun with a dark stripe down the back, and most of them I should estimate to measure at least 14½ hands; they are short and "stilty" in the forehand and usually hog-backed. Each of the mobs seen numbered from 20 to 30, and when disturbed they would go away together at a trot, and then dropping into single file would break into a canter. The Mongols shoot them, for the sake of their flesh, from behind rocks and in pits, this being the only means they have of getting within range, for none of their ponies can compare with them in point of speed. Gerbillon describes* one that he saw killed on the 13th July, 1689, while on a hunting excursion in the suite of the Emperor Kang-hi in Eastern Mongolia, and which I believe to be the same animal, in spite of the great distance between the two localities. He says: "They are called by the Mongols chitkey, and are of a sort that propagate their kind. It was a female, and seemed to be but a few months old; it had large ears, a long head, a slender body and long legs; its hair of an ash colour, its hoofs and feet uncloven like our mules." Duhalde also, in his 'General Description of Eastern Tartary,' tells us: "The wild mules go in small herds, and though the Chinese name Yo-lo-tse signifies (wild) mule, this animal is not like the tame ones, nor can it be brought to carry burdens; its flesh also is different, being of an agreeable taste, and, in the opinion of the Tartars, who feed much on it, as nourishing and wholesome as the wild boar." † I may mention that neither the asses or the ponies are ever tamed by the Mongols.

On the night of the 25th October we camped on the left bank of the Jabkan or Chagan-Tokoi river, as it is here called,

* Duhalde, 'Description of China,' &c., vol. ii. p. 305. London, 1741.

† Ibid., p. 253. Since my arrival in London, I have seen the Tibetan Kyang at the Zoological Society's Gardens, which is said to be the "Dchigetai" of Pallas, and therefore the same animal, though he has very little of the appearance of his nomadic brethren.

in lat. 46° 32′. This stream takes its rise in a chain of rugged mountains to the north of our course, and after keeping a S.S.W. direction for a distance of some 20 or 30 miles after issuing from the hills, turns towards the west and flows parallel with a high range of mountains, which ever since passing the Tui were visible to the south of our route, at a distance generally of some 50 or 60 miles. As usual in this country, every separate person questioned on the subject of these chains of mountains gives them different names, I have, however, adopted "Sirke" for the southern and "Urch" for the northern one, though I am by no means convinced that these are correct. The Sirke forms a most important geographical feature in this region, some of its highest summits reaching, I should estimate, from 3000 to 4000 feet above the general level. Proceeding from the Chagan-Tokoi in a north-west direction for about a day's journey, the Urch chain is found to bend somewhat towards the south, and to lose itself in the direction of the Sirke before arriving at the valley of the Jabkan. Beyond this again an open down-country is traversed at a great elevation, and then are reached masses of mountains with no general trend, which give rise to the Uliassutai River and another tributary of the Jabkan, of somewhat greater length and volume, called the Buyantu. On first entering these mountains a snow-covered pass was crossed some 8000 feet above the sea, after which a steady descent took place, for about two days' journey, until arriving in the valley of the Uliassutai River near its junction with the above tributary, and at about 20 miles below the settlement, which latter was reached on the 2nd November.

For some days before our arrival we heard reports from the Mongols of the presence of the Mahomedan rebels in quarters not far distant from Uliassutai, but took no serious notice of them, as the direction generally indicated of these quarters was to the east, viz., the Kangai Mountains and the neighbourhood of Urga, to which places I well knew it was impossible for them to have penetrated without crossing the road by which we had come from China, and in such case we should certainly have heard of them long ago. However, on the evening before arriving here, in the valley near the mouth of the Uliassutai River, I perceived a great muster of troops going on. Ponies by hundreds were being brought together from all the neighbouring hillsides, and camps were being formed by the men who had just been sent down from the settlement. At the time I could scarcely estimate the number of troops, as they were scattered about over so large an area, but I was subsequently informed that the whole force, including the garrison at Uliassutai, numbered about 2000—viz., 1400 Amoor Tartar or

Solon cavalry, and the remainder Chinese infantry. All the officers we met could speak Chinese and were very civil; they were to start the next morning with two bodies of the cavalry, of 500 each, for some point about a couple of days' journey towards the east or south-east, where they expected to find a large body of Mahomedans preparing for an attack on the place. Their information as to the whereabouts of the enemy had been obtained entirely from the Mongols, the most untrustworthy of people, and to this circumstance, now that I have witnessed the subsequent events, I attribute the return of this reconnoitring force, after about a week's absence, having allowed the rebels to proceed unperceived towards Kobdo. Had this force been supplied with better information, and merely shown itself in the rear of the enemy, it is probable Kobdo would never have been attacked, for it would have made a show of "the initiative," a plan that seldom fails of success amongst Asiatics. The alarm created by the departure of the troops from Uliassutai was serious enough, and it had the effect of disturbing matters there very considerably. None doubted but that the rebels were close at hand, and the only question one heard discussed was, by what time and from what direction an attack might be expected. All the Mongol owners of camels and ponies who usually seek employment there had fled with their precious livestock into the hill country towards the north; outward-bound caravans had put off their departure *sine die*, and whenever mention was made of continuing my journey towards the south, it was received either with ridicule at my rashness or with suspicion of my having secret understanding with the Mahomedans. All the inhabitants of, and traders to, Uliassutai have a lively recollection of the sacking and burning of the place in October 1870, when a small body of Mahomedans, from the neighbourhood of Urumtsi and Kutchên in the Tien Shan, attacked the place and took it in a few hours. It was then more populous and more wealthy than at present, and the loss of life and property in that one day is described as very considerable. It was the first year the Russians had visited the place under the new commercial treaty, a caravan of traders under the direction of a consul, M. Pavlinoff, having arrived only a few weeks previously; their houses were plundered and burned, and the whole party had to fly towards the north, arriving eventually, and after much suffering, at Minusinsk in Siberia.

There were at the time of my visit eight Russians at Uliassutai, three of whom were traders, and the others servants or camel-drivers, and all natives of Bisk. A joss-house, outside the town, had been allotted to them as a residence by the governor; and here they all lived, keeping a sort of general

store for the sale of English woollen manufactures, Russian cotton prints, brass ware and cutlery, tobacco, sugar, &c. These people were friendly enough; but as the only foreign language they understood was Mongolian, it was necessary to converse with them through Mongol-speaking Chinamen; and in this way but little information could be elicited, for, apart from the inconvenience of the mode of communication, caution was needful on both sides, and no subjects could be discussed except those we were willing the whole town should hear. Moreover, the Russians have an intense dislike to the Chinese, and will scarcely tolerate them in their houses even as interpreters; their business in Mongolia is to trade with the Mongols, they say, and they wish to have as little to do with the Chinese as possible. The executive government of the province of Uliassutai or Sanoin is administered by a Kiang Chün, who ranks with the Amban of Kobdo and the Kiang Chün of Tchuguchak; but superior to all these is the civil governor of the so-called "Cha-sa-ko," or western provinces of Tartary, who now resides at Uliassutai. The man at present filling this office is a Manchu, named Tchekan, who was formerly attached to that band of strolling diplomatists, known to residents in China as the "Burlingame Mission," which was condescendingly despatched to the various Courts of Europe by the Peking Government in 1868. During his two years' travels in Europe, Tchekan had received a certain whitewash of external civilisation. He was polite enough to ask after the Queen, gave me a detailed account of the presentation of the "mission" at Windsor Castle, and showed me an album full of crowned heads and distinguished personages. His yâmen never having been rebuilt since the visit of the Tunganis in 1870, he lives in a large and comfortable yourt pitched in what was once the inner court of it; and strange indeed it was to see in that barbarous dwelling even the few evidences of civilisation he had been able to bring with him into this settlement of the desert. His conduct towards me was all that could be wished, for I had brought with me, besides an official pass, a letter of introduction to him from one of the foreign Ministers at Peking. He caused the Kiang Chün to provide me with an extra Mongol passport, and also with a guide for Kobdo when at last it was found impossible to proceed, according to my original plan, towards the south. This guide, though doubtless supplied to us in perfect good, faith knew absolutely nothing of the country, and besides caused so much trouble to myself and camel-driver, that it was necessary to abandon him at a point in the desert about halfway between Uliassutai and Kobdo, thus for the second time leaving me in the disagreeable position of having to pilot my own caravan through a country entirely unknown to me.

Though the altitude of Uliassutai is not above 5736 feet, the climate is admitted on all hands to be a very severe one, and certainly during the eight days of my stay, though it was not yet the depth of winter, the cold was excessive; the thermometer seldom rose even to 20° Fahr. in the middle of the day, and observing at night became a most trying pursuit. The place is situated in a deep valley, having at its eastern end a narrow opening or gorge, through which flows the Uliassutai River, past the town and on towards the Jabkan, and the winds that almost daily whistle through this river-valley render it little better than a desert, well watered though it is. The only cultivation that is attempted by the settlers is that of cabbages and turnips for local consumption, and the only wood that exists is situated in sheltered nooks on the northern slopes of the hills, and consists of small and stunted pines, which are used for building and fuel.*

The business quarter of Uliassutai is about a mile distant from the official, or walled, city, and is separated from it by the bed of the river. It is a straggling, rambling, dirty little town, composed chiefly of Chinese houses, built of wood and mud bricks, but to a great extent also of Mongol yourts. It has even now a burned-out and half-deserted air, and many of the larger hongs and inns still stand charred and gutted, untouched since the day of the Tunganis' visit. In some of these, Mongols have pitched their yourts for the sake of the extra shelter afforded by what still remains of the walls, whilst others have been turned into "kraals" for camels and cattle. The trade, I am informed by the Russians, has greatly fallen off since the event of 1870, before which date it is said there were 180 merchants' hongs besides the shops, whereas now not half that number exists. The only exports from the place itself are live stock and skins, the large quantities of medicinal deerhorns sent from here to China having been first brought by the Russians or Kalmucks from the Altai ranges to the border, or to Kobdo, and there made over to Chinese traders. The chief imports are naturally flour and millet, material for clothing and cutlery as required by both Chinese and Mongols, and opium for the former only. Everything is exceedingly dear, as, for instance, flour, 3*l.* per cwt.; opium, 7*s.* 6*d.* an oz., and other things in proportion. Sheep even, that forty miles off can be bought for 12*s.*, are here sold for about 20*s.* Copper cash is not current, and the lowest weight of silver in common use is the mace, equal here to 8*d.* sterling.

* In all these northern mountains, including the Altais, this fact of the northern slope being wooded, and not the southern one, is a striking fact. The same thing, I am informed, is noticeable far down into Turkestan beyond the Issikul.

The resident population, exclusive of the soldiery, is at present about 700 Chinese, though, as there are always caravans coming and going, the number of Chinese at any one time to be found there is probably nearly 200 more. The number of resident Mongols in, and about, the town is said, in peaceful times, to be even larger than that of the Chinese, though I could obtain no trustworthy estimate of it in figures. At the time of my visit, however, the greater proportion of these had deserted the place, carrying with them their dwellings and live stock, rendering it impossible to form an estimate for one's self. Thus, including the soldiery and the mandarins and their attendants, some 4000 persons, in all, would seem to be the total population of this remote and little known Chinese colony.

After a halt of over a week, seeing that, although the Mahomedans were reported to have retired towards the south, it was still useless to think of attempting a journey in their very wake, I decided to start for Kobdo, the road to that place being the only one open to me. I was still in hopes that from there some means might be found of proceeding southwards, though it must be confessed that, having been unable, while at Uliassutai, to hear news of the arrival of the Russians at Urumtsi, I considered the chances in my favour but few.

The absence of the Mongols at Uliassutai had prevented me from changing the four cow-camels, now mere walking skeletons, for two fresh ones, as I had intended, or even from purchasing new ones, and I well knew that even if they contrived to reach Kobdo it was as much as could be expected; but to attempt a longer journey with them would be to court certain disaster.

On the 10th November, then, we retraced one day's journey as far as the confluence of the Buyantu and Uliassutai rivers, and then continuing on a general westerly course down the valley of the Jabkan for eight days reached a Mongol station, consisting of five yourts, on the official track, called Argalingtu, where it is necessary to cross the river in order to reach Kobdo, by skirting the southern shores of the Turgen and Kara lakes. Before reaching this place I had heard indistinct rumours of the rebels having been seen marching towards Kobdo; but as my informants were all Mongols, I scarcely believed it, after what had been reported at Uliassutai of their retreat towards the south. Here, however, it was confirmed by meeting whole families of fugitive Mongols passing across the river from the south-west, with their flocks, herds, and houses, to take refuge in the rugged chain of hills that bounds the river-valley towards the north. After waiting a day at Argalingtu and receiving rather more encouraging intelligence, we passed the river and

proceeded towards the southern end of the Baka Lake, a small sheet of sweet water, about 2 miles broad by 3 or 3½ miles long, and, after crossing a range of remarkable sand-hills, came upon the Turgen Lake the next day. This latter is called the *Kara*, or "black" lake, on the maps; but I could hear of it by no other name than that of *Turgen*.* It is a large and probably deep lake extending towards the north and north-west, as far as can be seen from the southern shore, and its water is sweet and beautifully clear. The range of sand-hills which skirts the eastern shore of the lake, and strikes far into the desert on the south, is not, I believe, connected with the other similar range running from the sources of the Buyantu and Uliassutai down the left bank of the Jabkan, to nearly opposite Argalingtu. Both these ranges, however, form a most peculiar feature in the country: their height is not considerable, perhaps never over 200 feet above the river; but being composed entirely of loose sand, are subject to very great changes both of altitude and form. One of the ordinary Mongolian gales has sometimes the effect, I am informed, of changing the whole aspect of the exposed portion of the range, and a very inconsiderable breeze is sufficient to obliterate the tracks of a large caravan of camels almost immediately after it has passed. In some places trenches, or gullies, have been hollowed out by the wind to a depth of 30 or 40 feet, leaving almost perpendicular sides; in others deep holes of a conical shape, excavated with wonderful precision, are found side by side with conical mounds of equally precise form; or alternate ridges and gullies of great depth and extraordinary uniformity extend one behind another for a distance of many hundreds of yards. The passage of these ranges of shifting sand is much dreaded by those who travel with camels, and it rarely happens that the best appointed caravans effect it without the loss of some of their animals. Moreover, after any marked alteration of the line generally traversed, it is exceedingly difficult to find the way, and, as no pasture of any kind exists among the hills themselves, it is almost impossible to camp during the passage without serious danger of losing the camels for want of food.

Past the south-west and west of Lake Turgen runs a bold chain of mountains in a direction nearly N.N.W. and S.S.E., terminating at its northern end on the shore of the southern extremity of the Kara Lake. From the southern end of Turgen two tracks conduct to Kobdo, one along the eastern slope of this chain, and between it and the lake, and the

* The *Aral* or *Ike Aral* of the maps is in reality the *Kara*, or *Hara* as it is pronounced in these regions. There are islands, however, in the lake, and as *Aral* signifies *island*, the confusion is easily accounted for.

other up the western slope after first crossing a pass in the chain itself. Along the western slope also runs the track from Kobdo to Manas and Urumtsi. After leaving our camp at the south end of the lake, thinking to take the route across the pass, and having proceeded about 8 miles towards it, we were met by a party of fugitive Mongols, who informed us that the Mahomedans had taken Kobdo and burned it only three days previously, that they had retired down the valley on the west side of the chain and were then encamped at the western end of the pass, intending to follow up their success at Kobdo by making a raid upon Uliassutai. The position appeared awkward enough; for to be caught in the open, in such feeble force as I was, by so large a body as this was represented to be, would have proved a hopeless case. However, on the next day, after having spent an anxious night in watching the pass, it was discovered that the rebels had left their camp, and, instead of making a descent upon Uliassutai, were continuing their march towards the south down the western valley. Two days later, after skirting the eastern base of this chain and crossing it by a pass near the shore of the Kara, we arrived at the southern end of that lake and crossed it on the ice. The distance between the nearest points of this and the Turgen is very inconsiderable—perhaps 15 to 20 miles—and the dividing land is comparatively low;* the water I believe to be sweet, for though all within my reach was at that time solidly frozen, there were no evidences of salt on the banks, and as the formation and general characteristics of its valley are similar to those of its neighbours, the Turgen and Baka, the presumption is that, like them, this also is a fresh-water lake. From the southern end, on a clear day, and at an altitude estimated at about 200 feet, though high hill tops were visible in all directions round it, the northern shore of the lake was itself invisible.

A long day's journey in a W.N.W. direction from the Kara now brought our party, on the night of the 28th November, to Kobdo.† To describe it as shortly as possible, it is situated in a large open valley or plain, surrounded by rugged barren hills, and is reached from the side of China and the Tian Shan by a track leading across a pass to the south-east, and from the Russian side by a similar track, conducting across the hills on the west. The

* The Kara is believed to receive the Jabkan River, and its altitude is some 350 feet greater than the Turgen. Can the latter be formed from the overflow of the former? The aspect of the dividing neck of land would favour the supposition.

† A native name for Kobdo very generally used by Mongols, Kalmucks, and Russians, is *San-kin koto*. The Chinese seldom or never use it, and I believe it to be purely Mongolian. *Ho-Ying*, or "back settlement," in contradistinction to *Tsien-Ying*, or "forward settlement," (viz., Uliassutai) is the generally used term among the Chinese.

plain itself is stony and entirely bare of all vegetation but a few scattered weeds. At one time it is said to have been covered with wood—the essential fact, indeed, that led to the establishment of the place; this, however, has long since been exhausted, and both wood and grass have now to be brought from other valleys among the hills, and mostly from considerable distances. The settlement consists of an official city or fortress, enclosed by a mud-brick wall and moat, both of which are new and in perfect repair, and of the open town or trading quarter lying immediately to the south-east of the fortress. Beyond this again, in peaceful times, is pitched a large and populous Mongol settlement, consisting, it is said, of several hundred yourts, though at the time of my visit there were not fifty remaining, the rest having either been carried off by their owners on the first alarm of rebels, or burned when the attack was made. The open town is entirely Chinese; it is regularly and solidly built of mud-bricks, the streets are wide and comparatively clean, and in the principal ones are rows of trees growing on either side, as in some European towns.

We camped on the night of our arrival, without grass or fuel, about a mile from the settlement, on the banks of a small and dirty stream flowing through the plain towards the lake, and in the morning obtained a view of the place and neighbourhood—a mere glance sufficing to confirm the reports we had heard upon the road, and to testify to the plunder and slaughter that had occurred only a few days previously. Though the Chinese dead had already been buried, the Mongol bodies still remained in the open amongst the charred remnants of yourts and clothing which strewed the plain in every direction, for it is a custom of the Mongols not to bury their dead, but to leave them in an exposed position to be devoured by the dogs and the ravens. Some of these bodies were headless, and others wantonly mutilated in other respects; and if this had taken place amongst the Mongols, to whom the Mahomedans usually show no especial animosity, the spirit in which they attacked the Chinese, their deadly enemies, can be easily imagined.

My tent was spied from the settlement at an early hour in the morning, and I could see the groups of soldiers and others examining us from off the wall of the fortress and the roofs of the houses; not one would come near us, however, and when I sent my camel-driver towards them to inquire about fuel and grass, they would have nothing to say to him, but motioned him to keep away. As the animals were starving, I was preparing to send my servant unarmed and with the passports in his hand to ride straight up to the city gate, when an old Mongol woman made her appearance from under the ruins of a yourt close

by and offered, for the consideration of a meal (for she, too, was starving) to act as ambassadress between us and the authorities in the city, and procure the necessaries of life we were so much in need of. In this way, a petty officer and some soldiers were induced to risk the venture of a visit to us, bringing with them a few armfuls of grass, and these, having accompanied my servant to the Amban's secretary, afterwards returned with a message that I was to camp inside the settlement, as the rebels were expected to return, and when there, I should receive as much grass, fuel, and well-water as I required. In other words, the mandarins would have me in the settlement, or would starve me out altogether. The disadvantages, as regarded my geographical work, of lodging under the eyes of the authorities was apparent enough, but at the moment there was no help for it, so during that same afternoon we moved, with bag and baggage, to the spot allotted to us by the Amban's secretary, which turned out to be the court-yard of a sort of custom-house close outside the gate of the fortress. In compliance with an invitation I visited the secretary, a Pekingese named Ming, later in the day, at his yamên inside the fortress. Though excessively civil, he would not allow me to see the Amban, whose nerves, he said, had been too severely shaken of late, and who, at the best of times, was a rather timid old gentleman and somewhat nervous of strangers—facts that I had no reason whatever to doubt, seeing that he had all the heaviest of the city artillery planted in a semicircle round the front of his yamên and pointed at the inside of the fortress gate. During this interview I was promised whatever necessaries of life I might want, as far as the authorities were able to procure them, and official camels and guides to take me to the border, than which I desired nothing better, now that all hope of a southern journey was at an end, as long as I was not hurried away; here, however, was precisely the gist of all the civility and care for my security, for in this, and all the subsequent, interviews I had with Ming for the purpose of urging reasons and excuses for remaining longer in the place, the only answer to be got was, that I had come well recommended, and that the Amban felt it his duty to send me on as quickly as possible to the border, for if anything happened to me here he would be held responsible—the order for camels would be got ready in two or three days.

The aspect of Kobdo at this time was one of almost entire desertion; beyond the soldiery, who had obtained security by shutting themselves up in the fortress, there were not twenty Chinese in the place, all the inhabitants not killed having bolted into the hills for safety, with whatever valuables they could carry with them. Most of the houses were burned to the bare

walls, and all had been looted; there was not a shop remaining or a single object or article of food to be bought; enormous stacks of wood and grass, collected by the merchants from considerable distances for the use of their caravans, had beeu burnt to cinders, and there was scarcely a camel in the place available for the collection of more. Such was the state of panic and excitement existing amongst all classes, that executions were taking place almost daily for mere trivial offences, and everybody who had uot a most plausible account to give of himself was suspected, in some way or another, to be in league with the rebels.

The Russians have a similar trade here to that at Uliassutai, but it is of more importauce, and there are more people usually engaged in it. On the night before the arrival of the Tunganis a large party of them started for the border, leaving two in the fortress in charge of their merchandise and furniture, and as these latter were eye-witnesses of the whole proceedings connected with the taking of the place, so far as could be seeu from their place of refuge, it may be interesting, as a specimen of Chinese warfare in Central Asia, to give a short account of the affair as related to me by one of them through a Mongol interpreter.

The Chinese force consisted of 500 Shansi soldiers from Tatung-foo, armed with matchlocks, and 250 Chili men from Kalgau, similarly armed, but partially drilled on the foreign system. These 750 formed the infantry; the cavalry was composed of 800 to 1000 Amoor Tartars or Solons. The rebel party consisted of at the outside 300 persons, and of this number a large proportion were women and children and poverty-stricken Mongols, who had joined as guides or camel-drivers, probably in consideration of their lives being spared. Of grown-up fighting Tunganis my informant is positive there were less than 200. Early in the day (18th November) they crossed the pass to the south-east of the city and advanced on the town, driving with them about a thousand loose camels to serve either as cover or to make their force appear more formidable in the eyes of the Chinese; they were all mounted on camels with the exception of a few of the chiefs, who rode ponies, and were all armed with spears or bows and arrows except about twenty, who had Chinese or Russian matchlocks. The infantry formed the front of the defending force and commenced the action by firing a random volley at the advancing Tunganis long before they had come within range and then retired precipitately on a joss-house, standing at the head of the main street of the town, round which a ditch and abattis had been prepared the day before. As the infantry fell back the Tartar cavalry was sent to charge, but after riding a short distance towards the enemy wheeled across

his front, yelling at the top of their voices, and then "continuing the wheel," which carried them straight into the fortress, left it to the Chinese to finish the engagement. The latter made a short stand in the joss-house, but after a few minutes of fighting appear to have become panic-stricken and to have made a rush for the city, which they only gained after losing about 150 of their number. Thus the Mahomedans were entirely masters of the open town, but having no guns were unable to touch the fortress; they devoted all that afternoon and part of the next day to a systematic looting of all the houses and shops, and the next evening deliberately set to work to burn the place, women, and children, riding about from house to house placing bundles of firewood and applying lighted sticks, while the soldiers on the city wall looked on. On the 20th, the town being in full blaze, the successful Tunganis took their departure through the same pass they had crossed on their arrival, not having lost, my informant declares, a single man in killed, though some may have been wounded.

The trade of Kobdo is in every respect similar to that of Uliassutai, but it is if anything somewhat greater. The population immediately before the late irruption of Tunganis is said by the best authorities I could question on the subject to have been about 1100 resident Chinese, to which may be added about 100 for passing caravans (for these are less numerous here than at Uliassutai, in spite of the trade being greater), 750 Chinese soldiers, 900 Tartar cavalry, and perhaps 3000 Mongols, making a total of nearly 6000 persons.* The only agriculture consists of cabbages, turnips, &c., and a little opium. All the fuel within the radius of a day's journey of Kobdo having been exhausted, it is thought the place will increase no further; indeed, instead of increasing, it had already begun to seek an outlet for itself, the result being the foundation of a promising settlement about two years ago near a large lamasery called Tsachar-Tsing, five stages towards the south on the road to Urumtsi, and situated in a populous and well-watered Mongol district. The existence of Tsachar-Tsing was a short one, for on the 12th November, on their way to Kobdo, the Tunganis paid it a visit and left not a stick of either lamasery or settlement standing.

On the 2nd December, having lived three days under the eyes of the custom-house officials, I received an intimation from Ming that the guides and animals would be ready next morning. A southern journey was now out of all question, my five camels—

* The total Mongol population of all Mongolia is said to have been estimated by M. Pavlinoff, after many years of inquiry, at *six millions*. But the accuracy of any estimate on such a subject, however carefully compiled, cannot but be exceedingly questionable.

one had dropped just before arrival here—were almost the only ones in the place besides those belonging to the officials, and were incapable of going a stage further, whilst for the necessaries of life I was at the mercy of the Amban. There was thus no course left open but to go, and on the morning of the 3rd we began our march across the Altais towards Suok, the nearest Chinese border post, distant about 180 miles in a W.N.W. direction. For the first three days confused masses of mountains were crossed through passes generally between 7000 and 8000 feet above the sea, but not till the fourth was any appearance of a chain noticeable, when a pass, called Hongorellen, was reached of 8896 feet, with snow-clad peaks stretching both to the north and south of it as far as it was possible to see. Within three miles to the north of the pass was a peak I should estimate at 12,000 feet or more, its covering of eternal snow stretching far down its rugged sides. After crossing this range, and beyond it again a number of lower parallel ridges abutting on the valley of the Kobdo River, a small stream called the Hatto, running through a wooded valley, was reached, and followed down a short distance to its confluence with the Kobdo. This latter is a narrow but fairly deep river originating in the Suok, and another small stream on the same watershed as the great Siberian Ob, and after keeping an E.S.E. course falls into the Kara some little distance to the north of Kobdo.

Passing the Kobdo on the 9th, somewhat below the Suok junction, and still holding a W.N.W. course, our party arrived two days later at the Chinese border station of the latter name. The Russians have no official post or settlement of any kind at Suok, or indeed within several days' journey of it, the nearest being Ukek, three stages, or about 60 miles, to the west across high and difficult passes of the Altais. Nor have they any trading settlement here either, though considerable encampments of Russian Kirghis or Hassacks are usually to be found on the river near the post, and even further within the Chinese border, as for instance, in the wooded valley of the Hatto. The place consists of about thirty yourts and the Chinese border officer, a military blue button, with a petty officer and eight or ten Mongol soldiers represent the government and executive. There are no duties either inwards or outwards, but passports are supposed to be shown by all who come from the side of Russia, though this is by no means always enforced, the Hassacks coming and going as they choose, and the Chinese officer not daring to interfere, for his force of ten Mongols would not face one single Hassack. These border tribes give much trouble to both Russian and Chinese authorities, and are the terror of Mongols and Kalmucks wherever they come in contact with

them; they are much mixed in race, and are of Russian or Chinese nationality, as the occasion happens to suit, and always sheep stealers and camel lifters by profession.

The name of *Hassack* is applied by the Mongols, Kalmucks, and Chinese to all the Mussulman tribes who wander into these regions from the west, excepting the Tunganis or Chinese Mahomedans. It is used in a general sense and irrespective of race or nationality much in the same way as the words Tartar and Kirghis are used by the Russians; thus a Tajik of Kokand and a "steppe" or "black" Kirghis would both come under the designation *Hassack*, though the first is of the undoubted Aryan type and of Kokandi nationality, and the latter of the Turanian type and a subject of Russia.

A temporary Russian trading settlement—temporary, that is, in the sense of being occupied in summer and left in charge of Kalmucks in the winter—stands on the river Chui on the northern slope of the main watershed, and about 50 miles nearly due north of Suok. The watershed in this direction is crossed by a high but not difficult pass, and is altogether an easier road in winter into Russian territory than the westerly one to Ukek and Chingistai; it was by this pass that I crossed the chain and reached the Chui settlement four days after leaving Suok. No boundary can be naturally more complete than that formed by this east and west chain of Altais for Russia and China; not only does it separate the river systems and the northern pine forests from the barren rocky deserts of the south, but it also constitutes the natural border line between the Kalmucks and the Mongols, and since its fixture as the political frontier some ten years ago the former have been enabled to escape from their previous anomalous position of owing allegiance to both States. They are now entirely under Russian rule, and though being rapidly impoverished and "improved" away by contact with civilisation, are still universally liked and respected for their simplicity, hospitality, and honesty; the condition of the mountain tribes of these people is that of hunters and fishers, and though their langauge has a Turkish root, they have little or no literature; their customs are most primitive, and their religious ceremonies grotesque in the extreme.* On the whole they are the most respectable Asiatics I have ever come in contact with.

Arriving at the temporary settlement on the Chui on the 17th December, I fell in with the party of Russian traders who had fled from Kobdo the night before the attack of the Tunganis, and who were then on their way to Bisk. Arrangements were

* The only name in use, in all these regions, for the Altai Kalmucks is *Telingit*.

made for me to join this party, and on the 19th we started down the Chui and Katune valleys to the most forward permanent settlement of the Russians, a place of about twenty log cottages, called Ongodai, on the Ursul tributary of the Katune.

From here to Bisk, the terminus of the post road in this direction, we travelled through a more or less cultivated country for the greater part of the way, and reached that place on the 4th January, 1873.

Note on the Construction of the Map to accompany Mr. Elias's Paper. By Mr. A. Keith Johnston.

The materials used for this map, besides the astronomical positions and running Survey by Mr. Elias, have been:—

(1) The positions determined astronomically by Fuss and Bunge, on the route from Kiachta towards Peking; by Fritsche, in the neighbourhood of Peking and on the Mongolian Route to Zaire-Ussu; by Lepissier, near the Great Wall of China; and by Mirosnichenko (as stated by Matusovski), of Suok.

(2) The native map of China, known as the Ta-tsing Atlas, published at Woo-chang in 1864, on the scale of about $\frac{1}{950000}$. The whole of that portion of the map which lies south of Mr. Elias's Route is from this source, but the longitudes of the Chinese map have been considerably altered to suit the astronomical position of Mr. Elias and the recent determinations of Kashgar and Yarkand. The position of Hami is a most important one in fixing the geography of the Eastern Tian Shan region. No astronomical observation for longitude has yet been recorded here, and the positions of Hami in longitude given by the Jesuit travellers from calculation vary to the extent of nearly two degrees. Reckoning the distance travelled from Liang-chau (the longitude of which was determined by observation of an eclipse in 1708 to be 13° 56′ w. of Peking). MM. Jartoux, Fridelli, and Bonjour, made the longitude of Hami 20° 32′ w. of Peking, or 95° 56′ e. of Greenwich. In the 4th sheet of the map of Chinese Tartary in Du Halde, vol. ii. Hami is placed, with their authority, in 22° 23′ 20″ w. of Peking, or in 94° 5′ 12″ e. of Greenwich. Again, Père Gaubil (in Souciet *) gives the longitude of Hami as 95° 39′ e. of Greenwich. In this map the longitude of 94° 40′ e. has been adopted as agreeing most nearly with the distances to Hami from all sides.

(3) The maps of the Russian and Chinese frontier by M.

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* 'Obs. Mathém., &c., en Chine,' vol. i., Paris, 1729.

Veniukow, in the 'Mittheilungen,' Part ix., 1872, and in the Journal of the Russian Geographical Society, 1873, have been used for that portion of the country which lies between Mr. Elias's Route and the Russian frontier.

(4) The Russian Topographical Map of the Mining District of the Altai, by F. Meien, 1864, on the scale of $\frac{1}{420000}$, has been reduced for the north-western portion of the map.

APPENDIX.

(1.) *Former Explorations.*

PREVIOUS journeys through portions of the region described in the foregoing narrative have been four in number, though only one, M. Matusowski's, can, in any sense of the word, be called a geographical exploration. To arrange them chronologically, they consist, firstly, of Mr. Atkinson's Tartar rides, undertaken for artistic purposes between 1846 and 1853, and fully described in his work, 'Oriental and Western Siberia,' London, 1858. The discredit thrown on this author's story by Russian writers and others is well known, and this is not the place to comment on their criticisms. I would only remark that since my return to England I have carefully searched those portions of Mr. Atkinson's narrative descriptive of the regions of Mongolia I have personally a knowledge of, with the view of showing that some internal evidence of its accuracy exists; and though on the face of it this is actually the case, yet I have been unable to find anything sufficiently clear and absolute to disprove effectually the condemning assertions of some of his critics. It must, however, be borne in mind that Mr. Atkinson professes to have undertaken his Mongolian wanderings solely for the purpose of sketching the scenery and inhabitants, and when we consider what difficulty the avowed geographical explorer finds in obtaining from Asiatics trustworthy information on the most commonplace subjects, and the time and labour he must spend in studying and sifting every question he puts and every answer he receives, it is in no way surprising that an artist should have ridden day after day over vast tracts of steppe, in the company of savages whose language he scarcely understood, with no thought of geographical matters in his head, and ultimately have written a narrative containing no accurate information, many geographical blunders, and one easily criticised by anybody who chose to take the trouble. Yet, withal, the journeys appear certainly to have been performed, and the story, so far as regards daily experiences of travel and adventure, may be essentially a true one.

2ndly. The mission of M. André Gustavitch Prinz, a Russian official from the border station of Suok to Kobdo in the year 1863, undertaken by order of his Government, for the purpose of making a treaty of commerce with the Chinese. The negotiations of this officer were unsuccessful, and as no geographical work was attended to by any of his party, we need not refer again to his expedition.

3rdly. The Russian Government, in following up their object of concluding a treaty of commerce to embrace all the Chinese settlements in Mongolia, sent in 1868 M. Shishmaroff, the consul at Urga, to Uliassutai, there to treat with the superior officer to the Amban of Kobdo. The consul was forwarded by the Chinese authorities of Urga by the official track, and provided with an order for a fresh pony at every stage. He followed the road to China for the first

fifteen stages to the south of Urga, which brought him to Zaire Ussu, the station where the China and Uliassutai tracks converge. Here he turned off to the westward and followed the official track to Uliassutai, which runs considerably to the northward of that taken by myself and laid down in the accompanying route-map. This journey may be described as a rapid Tartar ride, and is entirely barren, I believe, of geographical results; indeed, the impossibility of its being otherwise is apparent when we consider that the distance travelled was about 750 geographical miles, and the time occupied only thirteen days, viz., from 22nd July to 4th August.

4thly. We come to the only true exploratory journey ever undertaken in these regions. The partial success of M. Shishmaroff's negotiations in 1868 led the Russian Government to despatch an officer of higher rank in the summer of 1870 to Kobdo and Uliassutai to complete and ratify the treaty, and with instructions to take up his residence in Uliassutai, if on arriving there he should think it expedient. This officer was M. Pavlinoff, formerly consul at Chinguchak, and attached to his party was a Government topographer, M. Matusowski, with eight Cossacks as assistants. The route taken by this expedition was from the Upper Buchtarma through Russian territory to the border post of Suok, and thence by the usual track across the Hongorellen pass to Kobdo, which was reached on the tenth day after leaving Suok. From Kobdo M. Matusowski proceeded to Uliassutai, skirting the southern ends of the Kara and Turgen lakes, and then following up the Jabkan and Buyantu rivers. After a short stay at Uliassutai he returned to Russian territory by a Mongol track leading nearly north-west to the upper waters of the Yenessei, in the department of the Minusinsk.

While at Omsk, in January last, I had the pleasure of meeting M. Matusowski, when he showed me his manuscript maps, and explained to me that his method of conducting the survey was to make compass sketches of the country along the track, sometimes sending his Cossacks to take bearings from remarkable points, and when at important stations to make a local triangulation. He had not the means of fixing his position astronomically, and the only instrument he was provided with for the determination of altitude was an aneroid. His rate of travelling, moreover, was sufficiently rapid, as it was necessary for him to adjust his movements to those of the consul. Labouring under such disadvantages, therefore, we have little cause to wonder at the rather eccentric geography he puts forth in his new map of North-West Mongolia, as published in Petermann's 'Mittheilungen,' of 30th January, 1873. The most striking feature of all is the great change he has made in the latitudes of Kobdo and Uliassutai, and of all the region situated between the two; for, taking the Russian map of Asiatic Russia of 1866 and Keith Johnston's Asia of 1865 as bases, we find nothing to the extent of from 0° 40′ to 1° 10′ has been applied to the whole line. The change is the more remarkable as Veniukoff's map of the same district published in 1871 professes to be compiled chiefly from M. Matusowski's surveys, and his latitudes do not differ materially from the old maps, and consequently are fairly correct, for these latter were, considering the little known nature of the country, remarkably accurate in respect of latitude.

Besides the above inaccuracies of position there are also many of topography, though, on the whole, this branch of the work has been more successful. For instance, it is difficult to account for the Hatto running into the Kobdo from an E.S.E. direction, instead of from a southerly one, also for the great distance intervening between the Kara and Turgen lakes, and many other similar discrepancies, which are more easily appreciated by comparing the accompanying route sketch with M. Matusowski's map, than by detailing them in words.

Though not an exploration of the region in question, it may not be superfluous to mention that the Greek Dr. Pitagos, during his four years' wanderings in Central Asia, visited Uliassutai in June 1871, having crossed the

desert from Barkul in the company of a Chinese petty officer. His object was to escape into a civilised country by way of Peking or Siberia, but arriving as he did, without passports for either Mongolia or China proper, the Kiang Chün obliged him to return to Barkul after a stay of only ten days in Uliassutai. The geographical results of this portion of his journey may be looked upon as *nil*.

2. *Survey.*

During the journey, of which the foregoing is a narrative, a traverse survey was carried on along all the essential part, viz., from Kuei-Hwa-chêng, on the Chinese border, to Suok, on the Russian border, a distance of nearly 1300 geographical miles. The starting-point on which to base this traverse was fixed for latitude and absolute longitude by a careful series of astronomical observations, and the position of its terminating point is taken from the boundary survey made by order of the Russian Government. The courses were taken by a pocket compass, and the distances judged by the pace of camels, the value of which was determined by observed differences of latitude. All the courses, times, bearings of remarkable objects, &c., were entered systematically in a log-book during travelling, but nothing was protracted or *drawn* for fear of exciting the ill-will of the authorities.

The above line of 1300 miles is divided into 79 marches or stages, and, besides the two terminating points, it is checked at 10 intervening ones by astronomically determined latitudes, and at two by absolute longitudes.

At each of the 80 camps formed by the above marches, and at many other intervening points of interest, from 2 up to 40 readings of two separate aneroids were recorded, and three series of boiling-point experiments. Beyond the limits of the above 1300 miles, viz., from Kalgan to Kuei-Hwa-chêng on the one hand, and from Suok to Bisk on the other, making an additional 600 geographical miles, divided into 27 additional marches, 2 to 16 readings of each aneroid for several of the more important stations are recorded, and one additional series of boiling-point experiments. The terminating points of this 1900 geographical miles, it may be mentioned, have both been accurately determined by barometrical measurements.

In the accompanying map, constructed by Mr. Keith Johnston, the limits of the exploration are indicated by the *pink* coloured expanse on each side of the *red* route-line. The route-line itself is laid down from the above observations, and the traverse is plotted in between the crucial stations, march by march, and shows the number of each camp or station in figures for reference to the section of altitudes in the margin. Mountains, rivers, and other features, are inserted as taken from the log-book; but nothing based on native information appears within the pink expanse except in dotted lines.

3. *Climate.*

In the absence of exact data, there is but little to be said on this subject. When preparing in Shanghai to proceed to Mongolia, I was unable to procure thermometers to register the necessary degree of cold. One, a rough, ill-made instrument, was divided down to Zero Fahrenheit; but this I had the misfortune to break before requiring to use it, and the others registered only to 12°, being therefore useless in the open air on the latter part of the journey even during the warmest hours of the day. And it is necessary to note that the temperatures recorded with the aneroids in Appendix 7, form no guide to the condition of the climate, but only of the air in which the aneroids were registered, and which was usually that of a heated tent or yourt. This, however, does not apply to the figures given for Kuei-Hwa-chêng.

In Southern Mongolia, between Kalgan and Kuei-Hwa-chêng (about la

41°), at an average altitude of about 5000 feet, from August 2nd to 17th, strong southerly winds were prevalent, with a great deal of rain.

At Kuei-Hwa-chêng, lat. 40° 48′, long. 111° 47′, altitude 3506 feet, from August 17th to September 8th, the wind was from all quarters, though seldom from E., and usually light. Rain fell on six days, and there were occasional thunderstorms. With an ordinary thermometer, it was almost impossible to catch the times of greatest and least temperature. The following figures for seven days, however, may serve as some slight guide. From 4 to 5 A.M. (16h: to 17 h:) would here be the coldest period.

Date.	Day.		Night.	
	Temperature.	Hour.	Temperature.	Hour.
	°		°	
August 20 ..	74	2	62	16
,, 23 ..	74	2	50	13
,, 24 ..	72	2	55	13
,, 26 ..	71	2	48	16
,, 28 ..	68	2	54	14
September 5 ..	72	2	54	13
,, 7 ..	72	2	55	13

From September 8th to 21st (for altitudes see map), the winds were variable and moderately strong, the mean daily temperature probably some 10° below that at Kuei-Hwa-chêng, and occasionally a slight dew.

From 21st to 24th, with southerly winds and a somewhat higher temperature, rain and thunder were experienced; and on the night of the latter date, a gale of N.W. wind springing up, the summer suddenly broke up, and the winter, as rapidly, set in.

After this, and until arriving in the neighbourhood of Uliassutai (2nd November), the day almost invariably broke clear and still, and remained so until nearly noon, when a strong north-wester would spring up, and, with a more or less clouded sky, continue to blow until about an hour after sunset, when it would die out and the clouds would roll away. During this period no rain fell, snow only on two occasions, and no dew was perceptible. The mirage during the last half of September, and the first part of October, was sometimes very striking on clear days.

At Uliassutai (altitude 5736), from 2nd to 10th November, remarkably changeable weather prevailed; the winds being from all quarters varying from a calm to a gale, and the aneroid readings ranging over 0·73 in. The thermometer seldom rose even to 20° during the middle of the day.

In the valley of the Jabkan (11th to 18th November), strong westerly and northerly winds were experienced, sometimes with heavy snow-storms; and throughout the Altai regions, as far as the main watershed, long-continued series of westerly gales were prevalent, but without snow on the southern and eastern slopes except at great altitudes.

At Kobdo the climate is somewhat milder than that at Uliassutai, and this is not wholly occasioned by the mere difference of 900 feet in the altitude, but partly, I conceive, on account of the proximity of the great lake (which is not entirely frozen every year), and partly because the prevailing westerly wind in winter is much less severe than the northerly so common at the latter place.

4. *Itineraries.*

The following summaries of itineraries, though not all new, may possibly be of some slight interest, from the fact that they have been gathered from the mouths of camel-drivers and caravan traders, and not from the route-books of the Chinese; thus in many cases I have no doubt they differ from the published figures, but, on the whole, I believe them to be a better guide to the *time* occupied in making each journey; for though the marches differ greatly in length according to the nature of the country and other circumstances, yet they actually represent, as they are intended to do, the mean daily distance made good by a loaded camel, pony, or mule; therefore each march may be looked upon as one day's time. Out of China proper the *li* is never used as a standard of distance by those whose business is travelling, and an attempt to have given the following in this measurement would have resulted only in confusion.

No. 1.—*Peking to Uliassutai*, by official track.

Peking to Kuei-Hwa-chêng	12	marches.
Kuei-Hwa-chêng to Zaire Ussu	28	„
Zaire Ussu to Onghin River	9	„
Onghin to Uliassutai	27	„
	76	„

No. 2. *Peking to Ili*, by old official road.

Pekin to Si-ngan-fu	26	marches
Si-ngan-fu to Suchau	32	„
Suchau to Kia Yü Kuan	1	„
Kia Yü Kuan to Hami	16	„
Hami to Barkul	4	„
Barkul to Kuchên	8	„
Kuchên to Urumtsi	8	„
Urumtsi to Ili	18	„
	113	„

No. 3. Kuei-Hwa-chêng to Barkul by Alashan road, about	55	marches.
No. 4. Kuei-Hwa-chêng to Ning-hia-fu ..	26	„
No. 5. Zaire Ussu to Urga (official track)..	15	„
No. 6. Uliassutai to Kobdo (only track) ..	15	„
No. 7. Uliassutai to Barkul „ ..	19	„
No. 8. Uliassutai to Kuchên „ ..	23	„
No. 9. Kobdo to Suok „ ..	9	„

No. 10. *Kobdo to Chuguchak* (only track).

Kobdo to Tsachar-tsing..	5	marches.
Tsachar-tsing to Chuguchak..	26	„
	31	„

No. 11. *Kobdo to Kuchên* (only track).

Kobdo to Tsachar-tsing..	5	marches.
Tsachar-tsing to Kuchên	10	„
	15	„

No. 12. *Kobdo to Manas* (only track).

Kobdo to Tsachar-tsing	5 marches.
Tsachar-tsing to Manas	13 „
	18 „

No. 13. Ili to Chugnchak (official track) ..	18 marches.
No. 14. Kuchên to Turfan (trade track) ..	9 „

No. 15. *Hami to Urumtsi* (southern road).

Hami to Turfan	11 marches.
Turfan to Urumtsi	5 „
	16 marches.

Of the road from China to Kashgar and Yarkand I was never able to obtain a satisfactory itinerary; Baron von Richthofen, however, was given the following during his visit to Si-ngan-fu in January 1872:—

Si-ngan-fu to Lan-Chau-fu	1470 li.
Lan-Chau-fu to Suchau	1450 „
Suchau to Hami	1560 „
Hami to Pidjan	980 „
Pidjan to Turfan	240 „
Turfan to Kuche	1690 „
Kuche to Aksu	690 „
Aksu to Yarkand	1170 „
	9250 li.

He remarks:—"It is not stated what kind of *li* is meant. If it is the larger one (200 to one degree), then the distance from Si-ngan-fu to Yarkand is 3198 miles (statute)."

He further gives the following distances (in similar *li*), some of which, being on roads known to recent explorers, may serve as a test for the rest:—

Yarkand to Kashgar	490 li.
Yarkand to Koten	650 „
Aksu to Ushi	240 „
Aksu to Ili (direct mountain road)	1040 „
Turfan to Urumtsi	490 „
Barkul to Pidjan	160 „

About the last of these distances I cannot but think there is some mistake.

5. *Geological Specimens* (*described by Mr. James Tennant*).

No. 1.	Clay slate	From heights bounding Kuei-Hwa-chêng plateau on north.
„ 2.	Steatite	
„ 3.	Sandstone, grey	
„ 4.	Mica, in garnet schist	Mongolian plateau, about lat 42°, long. 111°.
„ 5.	Jasper	
„ 6.	Limestone, stalagmitic	
„ 7.	A brecciated silicious sandstone	
„ 8.	2 specimens, chalcedony or common agate	Gobi desert.
„ 9.	Touchstone	
„ 10.	Chalcedony	Mongolian plateau, about lat. 44°, long. 108.
„ 11.	2 specimens, argillaceous limestone	
„ 12.	Claystone discoloured by iron	

No. 13. Jasper
„ 14. Oxide of iron } Mongolian plateau, about lat. 45°, long. 106°.
„ 15. Chalcedony
„ 16. Chalcedony from bed of Onghin River.
„ 17. Quartz with chloride, Altais, basin of Kara Lake.
„ 18. 3 specimens quartz. Various parts of Altais between Kobdo and Russian border.
„ 19. Jasper, near Hongorellen Pass, Altais.
„ 20. Talcose slate, north slope of Altais, within Russian border.

6. RESULTS *of the* ASTRONOMICAL OBSERVATIONS *made by* Mr. NEY ELIAS, *in Western Mongolia, in the year* 1872, *calculated by* Mr. WILLIAM ELLIS, F.R.A.S., *of the Royal Observatory, Greenwich.*

I.—LATITUDE OF KUEI-HWA-CHÊNG.

1872.		°	′	″	
*Aug. 23.	By meridian altitude of δ Aquilæ. *South*	40	48	26	North.
,, 23.	By meridian altitude of α Aquilæ. *South*	40	48	16	
,, 23.	By altitude of Pole Star out of meridian	40	47	28	
,, 24.	By meridian altitude of α Aquilæ. *South*	40	48	6	
,, 24.	By altitude of Pole Star out of meridian	40	47	59	
,, 24.	By meridian altitude of β Cephei. *North*	40	47	39	
,, 28.	By meridian altitude of α Aquilæ. *South*	40	48	3	
,, 28.	By altitude of Pole Star out of meridian	40	47	21	
Sept. 5.	By meridian altitude of β Ceti. *South*	40	47	53	
,, 7.	By meridian altitude of γ Cephei. *North*	40	47	47	

CONCLUDED LATITUDE OF KUEI-HWA-CHÊNG = 40° 47′ 54″ NORTH.

II.—LATITUDE OF ONGHIN RIVER.

1872.		°	′	″	
Oct. 9.	By altitude of Pole Star out of meridian ..	45	54	16	North.
,, 9.	By meridian altitude of α Pegasi. *South* ..	45	54	42	

CONCLUDED LATITUDE OF ONGHIN RIVER = 45° 54′ 29″ NORTH.

III.—LATITUDE OF ULIASSUTAI.

1872.		°	′	″	
Nov. 6.	By altitude of Pole Star out of meridian ..	47	46	34	North.
,, 7.	By meridian altitude of γ Cephei. *North*	47	46	6	
,, 7.	By meridian altitude of γ Pegasi. *South*	47	46	14	
,, 8.	By altitude of Pole Star out of meridian ..	47	45	7	

CONCLUDED LATITUDE OF ULIASSUTAI = 47° 46′ 0″ NORTH.

IV.—LONGITUDE OF KUEI-HWA-CHÊNG.

(*a*) *By Lunar Distances.*

1872.		°	′	″	
Aug. 20.	From distance between α Aquilæ (west of moon) and moon's far limb	112	6	45	East.
,, 20.	From distance between α Tauri (east of moon) and moon's near limb	111	37	15	

* Observation marked "but middling."

1872.		°	′	″
* Aug. 24.	From distance between *a* Pegasi (west of moon) and moon's far limb	111	58	15
,, 26.	From distance between *a* Arietis (west of moon) and moon's far limb	111	54	45
† ,, 26.	From distance between β Geminorum (east of moon) and moon's near limb	112	2	0

Mean from Lunar Distances = 111° 55′ 48″ East.

(b) By Occultations of Stars by the Moon.

1872.		°	′	″
Aug. 23.	By disappearance of ξ Arietis (5½ magnitude) at the moon's bright limb	111	38	38 East.
‡ ,, 23.	By reappearance of ξ Arietis at the moon's unilluminated limb	111	37	59
,, 28.	By reappearance of ε Geminorum (3½ magnitude) at the moon's unilluminated limb	111	37	59

Mean from Occultations of Stars = 111° 38′ 12″ East.

The close agreement of the separate results from occultations is probably an accidental circumstance, but still the value found from the occultations is likely to be more trustworthy than that given by the lunar distances. The mean of the two results is, however, taken, which gives for the

CONCLUDED LONGITUDE OF KUEI-HWA-CHÊNG = 111° 47′ 0″ EAST.

V.—LONGITUDE OF ONGHIN RIVER.

By Lunar Distances.

1872.		°	′	″
Oct. 9.	From distance between *a* Scorpii (west of moon) and moon's near limb	103	29	30 East.
,, 9.	From distance between *a* Piscis Australis (east of moon) and moon's far limb	103	28	30

CONCLUDED LONGITUDE OF ONGHIN RIVER = 103° 29′ 0″ EAST.

VI.—LONGITUDE OF ULIASSUTAI.

By Lunar Distances.

1872.		°	′	″
Nov. 6.	From distance between Venus (west of moon) and moon's near limb	96	36	45 East.
,, 8.	From distance between *a* Pegasi (east of moon) and moon's far limb	96	48	15

CONCLUDED LONGITUDE OF ULIASSUTAI = 96° 42′ 30″ EAST.

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* "Observations but middling: star very indistinct."

† "Very uncertain: white clouds continually obscuring either the moon or star."

‡ It is remarked that the time of reappearance "may possibly be given 1ˢ or 2ˢ too late."

In the reduction of the observations for longitude (both by Lunar Distances and Occultations) the error of the 'Nautical Almanac' place of the moon, as determined from the Greenwich Observations, has been, in all cases, taken into account.

VII.—CONCLUDED TABLE OF OBSERVED LATITUDES AND LONGITUDES.

Name of Place.	Latitude North.	Longitude East from Greenwich.
	° ′ ″	° ′ ″
Kuei-Hwa-chêng	40 47 54	111 47 00
△ No. 7	42 04 00	..
,, 9	42 29 00	..
,, 12	43 01 00	..
,, 20	44 09 00	..
,, 26	45 31 00	..
Onghin River Crossing	45 54 29	103 29 00
△ No. 39 Baitarik Crossing	46 06 00	..
,, 45 Chagan Tokoi Crossing	46 32 00	..
Uliassutai	47 46 00	96 42 30
△ No. 63 Turgen Lake	47 34 00	..

7. I.—*Memorandum on the Calculation of the Heights of Stations on* Mr. NEY ELIAS'S *Journey from Kalgan to Bisk.* By Mr. RICHARD STRACHAN, F.M.S. of the Meteorological Office.

The hypsometer was faulty from the presence of air in the thermometer, some of which doubtless remained in the bulb while experimenting, and caused the boiling-point to read too high. The thermometer was arranged to be used in the horizontal position, and about an inch of the stem just above the bulb was cemented in the brass collar or lid of the boiler, so that it was not possible for the observer to assure himself that there was no air entangled in the mercury. The observations from this instrument are always in disaccordance with the aneroid readings; and, for these reasons, they are not trustworthy.

The small aneroid, without a name or number, gave very discordant readings; and its bad performance having been subsequently accounted for by the unsatisfactory certificate it obtained at the Kew Observatory, the readings from it are not considered worthy of being used conjointly with those from Aneroid Cary 85. The error obtained for this instrument at Kew, in 1866, was −0·15 at 30; and at this part of the scale was found to be the same at the Meteorological Office in April 1873. The Kew certificate, dated March 1873, is given on next page.

The means of the errors have been applied to the readings taken from this instrument, and the heights calculated from them.

The following data have been selected, as the best available, for the sea-level:—

Month.	Lat. N.	Long. E.	Mean Pressure.	Mean Temperature.
August	41°	110°	29·65	75°
September ..	43	105	29·80	65
October	46	100	30·00	45
November ..	48	95	30·20	20
December ..	50	90	30·25	5
January	52	85	30·30	−5

The mean pressures have been obtained from Buchan's work on the "Mean Pressure of the Atmosphere," and the mean temperatures from Dove's "Distribution of Heat." As no precise record was kept of the temperature of the air, Dove's values have been mainly relied on.

The heights for Kalgan, Si-ying-sze, Kuei-Hwa-chêng, Salt Lakes, Station 23, Tatz, Baitarik, Chagan, Tokoi, Station 48, Uliassutai, Stations 53, 56, 61, 62, 66, and all after, are based upon the sea-level data; those for the other stations have been computed from the differences of the aneroid readings from station to station.

It should be stated that the aneroid is compensated for temperature, and its errors have been found by comparing it with the standard barometer reduced to 32° Fahr.

April 24, 1873.

II.—Kew Observatory.—Certificate of Examination.

Small Aneroid Barometer by Cary, London. No. 85.

Compared with the Standard Barometer (reduced to 32° Fahr.) of the Kew Observatory, with the following results:—

Correction at 30 inches before the aneroid has been subjected to reduced pressure .. .. } −0·09 inch.

Correction at 30 inches after it has been down to 21 inches (observed about 3 weeks later) .. .. } −0·10 inch.

Pressure.	Corrections to Aneroid, with a Pressure Diminishing.	Corrections to Aneroid, with an increasing Pressure.
Inches.		
30	− 0·09	+ 0·05
29	− 0·12	+ 0·02
28	− 0·08	+ 0·09
27	− 0·07	+ 0·10
26	− 0·07	+ 0·11
25	− 0·05	+ 0·10
24	− 0·06	+ 0·10
23	− 0·02	+ 0·08
22	0·00	+ 0·05
21	+ 0·01	+ 0·01

Note.—When the sign of the correction is +, the quantity is to be *added* to the observed scale reading, and when − to be *subtracted* from it.

Samuel Jeffery,
Superintendent.

Kew Observatory,
March 1873.

SMALL ANEROID BAROMETER by CARY, London. Tested for TEMPERATURE COMPENSATION.

Kew Standard reduced to 32° Fahrenheit.	Aneroid, No. 85.			
	Mean of Readings.	Errors.	Correction.	Temperature Fahrenheit.
29·90	29·94	+·04	−·04	32
29·90	29·97	+·07	−·07	42
29·90	30·00	+·10	−·10	52
29·90	30·04	+·14	−·14	62
29·90	30·06	+·16	−·16	72
29·90	30·08	+·18	−·18	82
29·90	30·09	+·19	−·19	92

This instrument was tested here in March 1866, and the correction given at 29·7 inches = −0·15 inches; but the time allowed for it to remain (two days) was insufficient for a full and extended series of comparisons.

SAMUEL JEFFERY,
Superintendent.

KEW OBSERVATORY,
April 1873.

Note.—The tests applied by the authorities at the Kew Observatory to the Prismatic Compass used for determining the magnetic declination, to the Boiling-point apparatus, and to one of the aneroids, have proved these instruments to be so defective that their results are not recorded.—[ED.]

III.—Meteorological Register and Table of Altitudes.

Place and Elevation in Feet.	Date.	Time.	Aneroid. Carey, 85.	Thermometer.	Wind, &c.
	1872.			°	
Kalgan, Chinese town 2516	Aug. 2	7.0 a.m.	27·15	78	S., heavy rain
Si Ying Sze .. 4665	,, 5	Noon	25·15	67	S.
,, ...	,, 6	8.0 a.m.	·25	67	,,
,, ...	,, ,,	3.0 p.m.	·20	70	,,
,, ...	,, ,,	9.0 p.m.	·25	69	,,
,, ...	,, 7	8.0 a.m.	·24	68	,,
,, ...	,, ,,	9.0 p.m.	·20	67	,,
,, ...	,, 8	8.0 a.m.	·22	68	Calm
,, ...	,, ,,	2.0 p.m.	·15	70	,,
,, ...	,, ,,	7.0 p.m.	·16	70	,,
,, ...	,, 9	8.0 a.m.	·17	70	S. and variable
,, ...	,, ,,	2.0 p.m.	·10	72	,,
,, ...	,, ,,	9.0 p.m.	·10	71	,,
,, ...	,, 10	7.0 a.m.	·07	70	,,
,, ...	,, ,,	2.0 p.m.	·05	72	,,
Kuei-Hwa-chêng. 3506	,, 17	6.30 p.m.	26·14	70	W.
,,	,, 18	7.0 a.m.	·13	70	
,,	,, ,,	2.0 p.m.	·03	72	Southerly
,,	,, ,,	8.0 p.m.	·05	75	
,,	,, 19	7.30 a.m.	·13	73	
,,	,, ,,	1.30 p.m.	·13	73	S., rain
,,	,, ,,	7.30 p.m.	·13	72	
,,	,, 20	7.30 a.m.	·18	71	Calm and overcast
,,	,, ,,	1.30 p.m.	·18	71	,,
,,	,, ,,	7.0 p.m.	·18	73	Northerly at night
,,	,, 21	8.0 a.m.	·36	69	Calm and overcast
,,	,, ,,	2.0 p.m.	·30	70	,,
,,	,, ,,	7.30 p.m.	·30	70	,,
,,	,, 22	7.30 a.m.	·30	70	
,,	,, ,,	1.0 p.m.	·28	70	Southerly rain
,,	,, ,,	7.0 p.m.	·24	69	
,,	,, 23	8.0 a.m.	·12	68	
,,	,, ,,	2.0 p.m.	·08	71	Calm night, Northerly
,,	,, ,,	7.30 p.m.	·17	70	
,,	,, 24	8.0 a.m.	·25	68	
,,	,, ,,	2.0 p.m.	·22	69	Northerly
,,	,, ,,	7.0 p.m.	·22	71	
,,	,, 25	8.0 a.m.	·28	68	
,,	,, ,,	2.0 p.m.	·22	70	Calm
,,	,, ,,	8.0 p.m.	·25	69	
,,	,, 26	8.0 a.m.	·25	67	
,,	,, ,,	2.0 p.m.	·22	68	N. Westerly
,,	,, ,,	8.0 p.m.	·20	68	
,,	,, 27	8.0 a.m.	·10	64	
,,	,, ,,	2.0 p.m.	25·98	69	Thunderstorm
,,	,, ,,	8.0 p.m.	26·00	68	
,,	,, 28	8.0 a.m.	26·16	64	W.
,,	,, ,,	2.0 p.m.	·13	65	,,
,,	,, ,,	8.0 p.m.	·16	65	,,
,,	,, 29	8.0 a.m.	·25	64	?
,,	,, ,,	2.0 p.m.	·27	65	,,

III.—METEOROLOGICAL REGISTER AND TABLE OF ALTITUDES—*continued.*

Place and Elevation in Feet.	Date.	Time.	Aneroid. Carey, 85.	Thermometer.	Wind, &c.
	1872.			°	
Kuei-Hwa-chêng. 3506	Aug. 29	8.0 p.m.	·30	64	?
,,	,, 30	8.0 a.m.	·36	63	,,
,,	,, ,,	2.0 p.m.	·30	65	,,
,,	,, ,,	8.0 p.m.	·30	64	,,
,,	,, 31	8.0 a.m.	·28	64	Easterly
,,	,, ,,	2.0 p.m.	·20	68	,,
,,	,, ,,	8.0 p m.	·20	67	,,
,,	Sept. 1	7.0 a.m.	·20	65	Calm
Ho Kou, Yell. Riv. 3270	,, 2	5.0 p m.	·47	..	,,
,,	,, 3	8.0 a.m.	·52	..	,,
Kuei-Hwa-chêng	,, 4	4.0 p.m.	·37	69	Northerly
,,	,, 5	8.0 a.m.	·40	67	?
,,	,, ,,	2.0 p.m.	·32	69	,,
,,	,, ,,	8.0 p m.	·30	69	,,
,,	,, 6	8.0 a.m.	·37	67	,,
,,	,, ,,	2.0 p.m.	·30	72	Thunderstorm
,,	,, ,,	8.0 p.m.	·38	70	
,,	,, 7	8.0 a.m.	·49	67	N.W.
,,	,, ,,	2.0 p.m.	·49	68	,,
,,	,, ,,	8.0 p.m.	·55	68	N.
,,	,, 8	8.0 a.m.	·63	63	,,
,,	,, ,,	2.0 p.m.	·62	68	,,
△ 1 foot of pass	,, ,,	9.0 p.m.	·38	61	,,
,, 3358	,, 9	8.0 a.m.	·42	60	,,
,,	,, ,,	4.0 p.m.	·37	65	,,
△ 2, 3′ N. 30 W. of △ 1	,, ,,	9.0 p.m.	25·92	60	,,
,, 3891	,, 10	6.0 a.m.	·87	62	?
Top of Pass .. 5049	,, ,,	8.0 a.m.	24·88	?	?
△ 3 Ho-tiĕ-sze	,, 10	2.0 p.m.	·87	67	?
,, ..	,, ,,	8.0 p.m.	·84	66	,,
,, .. 5064	,, 11	6.0 a.m.	·85	55	,,
Kuku Illikung ..	,, ,,	Noon	·93	?	,,
△ 4 ,, .. 4974	,, ,,	11.0 p.m.	·60	49	,,
,, ... 5362	,, 12	6.0 a.m.	·53	52	S.
△ 5	,, ,,	11.0 p.m.	·95	55	,,
,, ... 4963	,, 13	7.0 a.m.	·93	53	S.W
△ 6	,, ,,	8.0 p.m.	25·32	62	,,
,, ... 4579	,, 14	7.0 a.m.	·26	52	S.W.
△ 7	,, ,,	9.0 p.m.	·48	65	,,
,, ... 4393	,, 15	7.0 a.m.	·47	63	W.
△ 8 (Salt lakes)	,, ,,	7.0 p.m.	26·13	73	W., rain at night
,, ,, .. 3641	,, 16	8.0 a.m.	·18	73	N.
△ 9	,, ,,	9.0 p.m.	·09	65	,,
,, ... 3736	,, 17	8.0 a m.	·06	61	,,
△ 10	,, ,,	11.0 p.m.	·30	56	,,
,, ... 3493	,, 18	8.0 a.m.	·30	68	,,
△ 11	,, ,,	11.0 p.m.	25 98	59	N., rain at night
,, ... 3832	,, 19	8.0 a.m.	·98	60	Variable.
△ 12	,, ,,	Midnight	26·05	56	,,
,, ... 3747	,, 20	10.0 a.m.	·07	68	S.E.
△ 13	,, ,,	Midnight	·32	63	,,
,, ... 3428	,, 21	10.30 a.m.	·38	74	Southerly
△ 14	,, ,,	7.30 p.m.	·33	73	,,

III.—Meteorological Register and Table of Altitudes—*continued.*

Place and Elevation in Feet.	Date.	Time.	Aneroid. Carey, 85.	Thermometer.	Wind, &c.
	1872.			°	
△ 14 3417	Sept. 22	9.0 a.m.	·43	66	Southerly, thunder and rain
△ 15	,, ,,	9.30 p.m.	·97	65	,,
,, ... 2827	,, 23	6.0 a.m.	·92	55	Variable.
△ 16	,, ,,	8.30 p.m.	·83	64	Variable, rain
,, ... 2927	,, 24	5.30 a.m.	·86	61	Southerly, rain
△ 17	,, ,,	9.0 p.m.	·47	53	,,
,, ... 3325	,, 25	6.0 a.m.	26·46	50	N.W.
△ 18	,, ,,	8.0 p.m.	·08	51	,,
,, ... 3648	,, 26	8.0 a.m.	·20	62	N.
△ 19	,, ,,	8.30 p.m.	25·53	42	,,
,, ... 4271	,, 27	6.0 a.m.	·56	47	N.W.
△ 20	,, ,,	11.0 p.m.	26·13	37	,,
,, ... 3600	,, 28	9.0 a.m.	·23	71	Calm
△ 21	,, ,,	11.30 p.m.	25·70	37	,,
,, ... 4104	,, 29	6.0 a.m.	·70	39	Southerly
△ 22	,, ,,	Midnight	26·22	34	,,
,, ... 3585	,, 30	10.0 a.m.	·23	65	,,
△ 23	,, ,,	Midnight	25·63	40	,,
,, ... 4187	Oct. 1	10.0 a.m.	·62	56	N.W.
△ 24	,, ,,	Midnight	·65	37	,,
,, ... 4145	,, 2	..	..	..	,,
,, ...	,, 3	Noon	·67	65	Northerly
,, ...	,, ,,	8.0 p.m.	·65	54	N.W.
,, ...	,, 4	8.0 a.m.	·67	46	,,
△ 25	,, ,,	7.0 p.m.	·72	42	,,
,, ... 4032	,, 5	9.0 a.m.	·82	48	?
△ 26	,, ,,	11.0 p.m.	·48	33	,,
,, ... 4355	,, 6	9.0 a.m.	·44	56	W.
△ 27	,, ,,	10.0 p.m.	·12	35	,,
,, ... 4670	,, 7	10.0 a.m.	·20	61	N.W.
△ 28	,, ,,	11.0 p.m.	·13	30	,,
,, ... 4660	,, 8	10.0 a.m.	·22	54	N.
△ 29 Onghin ..	,, ,,	9.0 p.m.	·10	34	,,
,, ,, .. 4740	,, 9	10.0 a.m.	·17	45	N.W.
,, ,, ..	,, ,,	3.0 p.m.	·11	68	,,
,, ,, ..	,, ,,	9.0 p.m.	·10	..	,,
,, ,, ..	,, 10	9.0 a.m.	24·98	60	S.W.
△ 30	,, ,,	4.0 p.m.	·74	72	,,
△ 30	,, 10	9.0 p.m.	·77	66	S.W.
,, ... 5220	,, 11	9.0 a.m.	24·63	60	,,
△ 31	,, ,,	10.0 p.m.	23·90	37	,,
,, ... 6118	,, 12	9.0 a.m.	·88	52	N.W.
△ 32	,, ,,	10.0 p.m.	·50	22	,,
,, ... 6540	,, 13	Noon ..	·53	54	,,
△ 33	,, ,,	Midnight	·30	27	,,
,, ... 6790	,, 14	9.0 a.m.	·28	36	Calm
△ 34, Tatz ..	,, ,,	8.30 p.m.	·68	41	,,
,, ,, .. 6296	,, 15	10.0 a.m.	·77	56	W.
△ 35	,, ,,	9.0 p.m.	·27	26	,,
,, ... 6673	,, 16	10.0 a.m.	·50	42	,,
△ 36-8′ W. of Tui ..	,, ,,	10.0 p.m.	·94	20	,,
,, ,, .. 6050	,, 17	9.0 a.m.	·96	30	,,

III.—METEOROLOGICAL REGISTER AND TABLE OF ALTITUDES—*continued.*

Place and Elevation in Feet.	Date.	Time.	Aneroid. Carey, 85.	Thermometer.	Wind, &c.
	1872.			°	
△ 37	Oct. 17	Midnight	24·18	15	W.
,, ... 5806	,, 18	10.0 a.m.	·17	37	Variable
△ 38	,, ,,	Midnight	·10	15	,,
,, ... 5836	,, 19	11.0 a.m.	·20	46	N.W.
△ 39	,, ,,	11.0 p.m.	23·75	21	,,
,, ... 6220	,, 20	10.0 a.m.	·82	37	,,
Baitarik 4836	,, ,,	7.0 p.m.	24·98	..	,,
△ 40	,, ,,	Midnight	23·97	17	,,
,, ... 5910	,, 21	11.0 a.m.	·98	54	,,
△ 41	,, ,,	Midnight	·67	19	,,
,, ... 6252	,, 22	10.0 a.m.	·66	39	W.
△ 42	,, ,,	11.0 p.m.	·51	17	,,
,, ... 6455	,, 23	10.0 a.m.	·43	42	,,
△ 43	,, ,,	8.0 p.m.	·68	27	,,
,, ... 6165	,, 24	10.0 a.m.	·79	38	N.W.
△ 44	,, ,,	11.0 p.m.	·16	18	,,
,, ... 6770	,, 25	10.0 a.m.	·20	46	W.
△ 45	,, ,,	10.0 p.m.	·57	23	,,
,, ... 6338	,, 26	11.0 a.m.	·59	46	N.W.
(Chagan Tokoi) .. 6017	,, ,,	4.0 p.m.	23·77	..	,,
△ 45	,, ,,	11.0 p.m.	·58	36	,,
,, ...	,, 27	11.0 a.m.	·62	41	W.
(Chagan Tokoi) ..	,, ,,	2.0 p.m.	·78	..	,,
△ 45	,, ,,	11.0 p.m.	·93	35	N.E.
,, ...	,, 28	10.0 a.m.	·96	42	Variable
(Chagan Tokoi) ..	,, ,,	2.0 p.m.	24·11	..	,,
△ 46	,, ,,	10.0 p.m.	23·23	below 12	,,
,, ... 6638	,, 29	10.0 a.m.	·12	29	N.E.
△ 47	,, ,,	10.0 p.m.	22·63	20	,,
,, ... 7331	,, 30	10.0 a.m.	·63	35	Variable
△ 48	,, ,,	11.0 p.m.	23·06	below 12	,,
,, ... 6871	,, 31	10.0 a.m.	·03	37	E.
△ 49	,, ,,	9.0 p.m.	·85	32	,,
,, ... 6060	Nov. 1	10.0 a.m.	·72	38	Variable
△ 50	,, ,,	10.0 p.m.	24·31	29	,,
,, ... 5385	,, 2	9.0 a.m.	·53	32	,,
△ 51 Uliassutai	,, ,,	7.0 p.m.	·32	26	,,
,, 5736	,, 3	11.0 a.m.	·22	33	?
,,	,, ,,	9.0 p.m.	·18	46	,,
,,	,, 4	11.0 a.m.	·09	33	Calm and overcast
,,	,, ,,	9.0 p.m.	·08	44	,,
,,	,, 5	11.0 a.m.	23·93	32	Variable and stormy
,,	,, ,,	9.0 p.m.	·80	38	,,
,,	,, 6	10.0 a.m.	·83	34	N.
,,	,, ,,	9.0 p.m.	·88	37	,,
,,	,, 7	10.0 a.m.	24·13	27	N.W.
,,	,, ,,	9.0 p.m.	·26	28	,,
,,	,, 8	10.0 a.m.	·37	26	W.
,,	,, ,,	10.0 p.m.	·45	24	,,
,,	,, 9	10.0 a.m.	·38	23	Variable
△ 51 Uliassutai	,, 9	10.0 p.m.	·08	36	,,
,, ...	,, 10	9.0 a.m.	24·08	32	W.
△ 52	,, ,,	10.0 p.m.	·59	below 12	,,
,, ... 5240	,, 11	9.0 a.m.	·63	19	Variable

III.—Meteorological Register and Table of Altitudes—*continued.*

Place and Elevation in Feet.	Date.		Time.		Aneroid, Carey, 85.	Thermometer.	Wind, &c.
	1872.					°	
△ 53	Nov.	11	11.0	p.m.	·30	22	Variable
,, ... 5567	,,	12	9.0	a.m.	·28	25	N. Westerly
△ 54	,,	,,	6.0	p.m.	25·05	26	,,
,, ... 4705	,,	13	9.0	a.m.	·07	38	W.
△ 55	,,	,,	11.0	p.m.	24·91	below 12	,,
,, ... 4877	,,	14	9.0	a.m.	·93	31	W., snowstorm
△ 56	,,	,,	8.0	p.m.	25·18	26	,,
,, ... 4565	,,	15	9.0	a.m.	·28	35	Variable, snow
△ 57	,,	,,	9.0	p.m.	·35	26	,,
,, ... 4500	,,	16	9.0	a.m.	·23	28	N.E.
△ 58	,,	,,	11.0	p.m.	24·32	21	,,
,, ... 5500	,,	17	9.0	a.m.	·29	38	N.W.
△ 59	,,	,,	11.0	p.m.	·98	15	,,
,, ... 4827	,,	18	10.0	a.m.	·94	27	Variable
△ 60 Argalingtu	,,	,,	7.0	p.m.	25·17	25	,,
,, ... 4633	,,	19	9.0	a.m.	·10	27	Southerly
△ 61	,,	,,	10.0	p.m.	·19	29	,,
,, ... 4415	,,	20	9.0	a.m.	·51	25	N.W.
△ 62	,,	,,	9.0	p.m.	·87	15	,,
,, ... 3852	,,	21	9.0	a.m.	·93	21	S.E.
△ 63 on Turgen	,,	,,	9.0	p.m.	·99	29	,,
,, ... 3770	,,	22	9.0	a.m.	·97	32	W.
△ 64	,,	,,	8.0	p.m.	·63	29	,,
,, ... 4150	,,	23	9.0	a.m.	·74	32	S.
△ 65	,,	,,	7.0	p.m.	24·43	43	,,
,, ... 5400	,,	24	9.0	a.m.	·29	32	Calm
△ 66	,,	,,	9.0	p.m.	·08	29	,,
,, ... 5766	,,	25	9.0	a.m.	23·96	18	N.W.
△ 67	,,	,,	9.0	p.m.	24·32	16	,,
,, ... 5454	,,	26	9.0	a.m.	24·32	30	W.
△ 68 on Kara..	,,	,,	9.0	p.m.	25·68	18	,,
,, ,, .. 4123	,,	27	9.0	a.m.	·60	26	Westerly
△ 69	,,	,,	9.0	p.m.	24·72	24	Westerly, storm
,, ... 4950	,,	28	9.0	a.m.	·89	35	S.
△ 70 Kobdo ..	,,	,,	9.0	p.m.	·84	19	,,
,, ,, .. 4850	,,	29	9.0	a.m.	·79	29	Southerly
,, ,, ..	,,	,,	9.0	p.m.	·96	37	,,
,, ,, ..	,,	30	9.0	a.m.	·94	34	S.W.
,, ,, ..	,,	,,	9.0	p.m.	·93	33	,,
,, ,, ..	Dec.	1	9.0	a.m.	·81	43	W.
,, ,, ..	,,	,,	9.0	p.m.	·98	52	,,
,, ,, ..	,,	2	9.0	a.m.	·90	51	,,
,, ,, ..	,,	,,	9.0	p.m.	·83	46	,,
,, ,, ..	,,	3	9.0	a.m.	·73	46	,,
△ 71 6225	,,	4	8.0	a.m.	23·49	18	,,
△ 72 6672	,,	5	7.0	a.m.	·07	17	,,
△ 73 6924	,,	6	7.0	a.m.	22·87	24	N.W.
△ 74	,,	,,	7.0	p.m.	21·13	35	,,
,, ... 8896	,,	7	7.0	a.m.	·17	16	,,
△ 75	,,	,,	7.0	p.m.	22·08	34	,,
,, ... 7878	,,	8	7.0	a.m.	22·00	28	W.
△ 76	,,	,,	7.0	p.m.	23·20	70	,,
,, ... 6648	,,	9	7.0	a.m.	·14	32	,,
△ 77	,,	,,	10.0	p.m.	22·53	32	,,

III.—METEOROLOGICAL REGISTER AND TABLE OF ALTITUDES—*continued.*

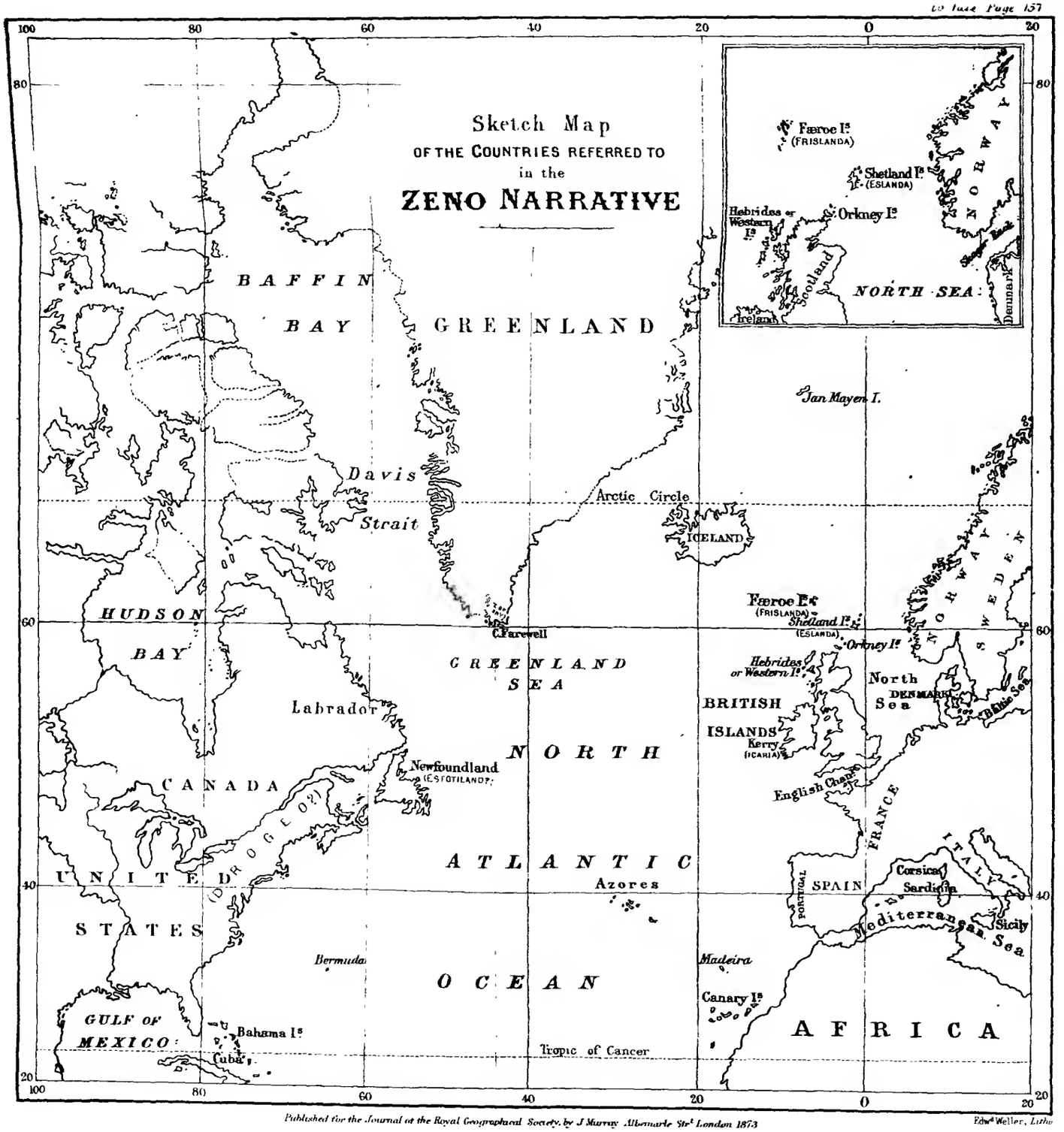
Place and Elevation in Feet.		Date.		Time.	Aneroid. Carey, 85.	Thermometer.	Wind, &c.
		1872.					
△ 77	7392	Dec.	10	7.0 a.m.	·52	26°	W.
△ 78	6950	,,	,,	10.0 p.m.	·92	38	,,
△ 79 Suok ..		,,	11	7.0 p.m.	23·32	36	N.W.
,, ,, ..	6302	,,	12	9.0 a.m.	·28	32	W.
,, ,, ..		,,	,,	9.0 p.m.	·38	39	,,
,, ,, ..		,,	13	9.0 a.m.	·48	34	N.W.
,, ,, ..		,,	,,	9.0 p.m.	·51	34	,,
,, ,, ..		,,	14	8.0 a.m.	·48	29	,,
Chui and Katune Confluence ..	2646	,,	23	6.0 p.m.	27·50	10 to 15	,,
		1873.					
Bisk		Jan.	5	9.0 a.m.	29·63	59	,,
,, ...	416	,,	,,	9.0 p.m.	·96	58	,,
,, ...		,,	6	9.0 a.m.	30·12	55	Calm
,, ...		,,	,,	9.0 p.m.	·08	56	,,
,, ...		,,	7	9.0 a.m.	29·95	53	N.E.
,, ...		,,	,,	9.0 p.m.	·93	52	,,
,, ...		,,	8	9.0 a.m.	·92	52	,,
,, ...		,,	,,	9.0 p.m.	·87	51	,,
,, ...		,,	9	Noon	·86	52	Calm
,, ...		,,	,,	10.0 p.m.	·83	51	,,
,, ...		,,	10	9.0 a.m.	·84	51	N.E.
,, ...		,,	,,	9.0 p.m.	·80	52	,,
,, ...		,,	11	9.0 a.m.	·81	52	E.
,, ...		,,	,,	9.0 p.m.	·71	51	,,
,, ...		,,	12	9.0 a.m.	·69	51	,,

VIII.—*The Site of the lost Colony of Greenland determined, and Pre-Columbian Discoveries of America confirmed, from 14th Century Documents.* By R. H. MAJOR, F.S.A., Secretary R.G.S.

[*Read*, June 9th, 1873.]

MY object in the present paper is to bring before you two geographical documents, one Venetian, the other Greenlandic, of the close of the fourteenth century: to demonstrate from internal evidence the authenticity of the former, which has been doubted and even denied, and to prove by a geographical discovery of my own the correctness of the latter, which had been impugned on a very vital point; and, having established the genuineness and validity of both documents, to determine from them beyond all dispute the true site of the lost Greenland Colony, and to show that at that period, which was a hundred years before the great voyage of Columbus across the Atlantic,

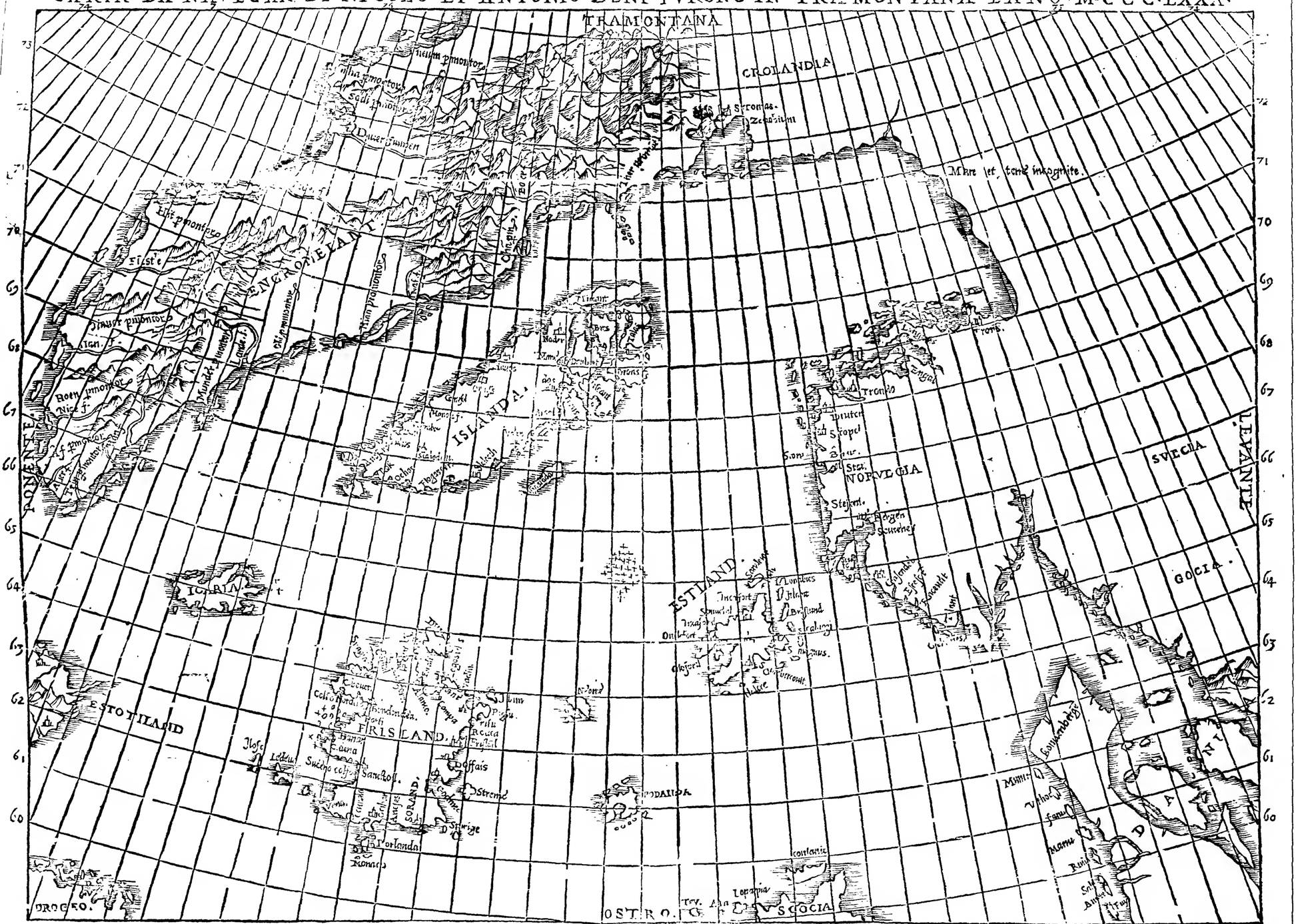
to face Page 157



Published for the Journal of the Royal Geographical Society, by J. Murray, Albemarle Str.t London 1873

Edw.d Weller, Litho

CARTA DA NAVEGAR DE NICOLO ET ANTONIO ZENI FVRONO III TRAMONTANA LANO·M·CCC·LXXX·



AUTOTYPE

there still existed remains of the ancient Scandinavian colonists in North America. The outline of the Venetian story is as follows:—Towards the close of the fourteenth century (the precise date will be matter for special consideration presently), Nicolò Zeno, a member of one of the noblest and most ancient families in Venice, went at his own expense on a voyage, rather of curiosity than of discovery, into the Northern seas. For a long series of years before his time, the Flanders voyage from Venice had been a matter of annual occurrence, but chance gave to this voyage a very peculiar interest. Nicolò Zeno was wrecked on what he describes as the island of Frislanda, and he and his companions were rescued from the wreckers by the chief of a neighbouring principality, named Zichmni, who happened to be there, and into whose service he entered in the capacity of pilot of his fleet. After remaining with this chieftain a year or so, Nicolò Zeno wrote home to his brother Antonio, inviting him to join him, which he did. Nicolò survived his brother's arrival four years, and died in Frislanda. Antonio remained ten years more in the service of Zichmni, and then returned to Venice, where he died, as far as we may judge from the annals, about the year 1405 or 1406. It is from the above-mentioned letter of Nicolò to Antonio, and subsequent letters from Antonio to a third brother, Carlo (a very distinguished man in Venetian history), that the narrative of the movements of the two brothers is derived.

After Antonio's arrival the two brothers accompanied Zichmni in a victorious attack on what can be clearly shown to be the Shetland group, although named Eslanda. The narrative, however, fortunately treats at greater length on two much more important subjects; viz., a visit by Nicolò Zeno to Greenland, which he calls Engroneland, and the observations of some fishermen in two parts of North America, called respectively Estotiland and Drogeo, showing the existence at that period, more than a century before the time of Columbus, of the remains of those old Scandinavian colonists mentioned by Adam of Bremen in the eleventh, and Ordericus Vitalis in the twelfth, century, and about whom we have learned so much in the present century from the Danish antiquaries C. C. Rafn and others. The whole story had been written out by Antonio Zeno, but a descendant of his, named Nicolò Zeno, born in 1515, when a boy, not knowing the value of these papers, tore them up, but, some of the letters surviving, he was able from them subsequently to compile the narrative and publish it, as we now have it, in the year 1558. He found also in the palace a map, rotten with age, illustrative of the voyages. Of this he made a copy, unluckily supplying, from his own reading of the narrative, what

he thought was requisite for its illustration. The first to do himself honour by vindicating the truth of the Zeno story was the distinguished companion of Captain Cook, Johann Reinhold Forster, in his 'History of the Voyages and Discoveries in the North,' published in *German*, Frankfort, 1784, *English*, London, 1786, 4to; but the value of his dissertation is marred by many wild conjectures. Eggers, in his well-known prize essay on the 'True Site of the Old East Greenland,' Kiel, 1794, 8vo, was another advocate of the truth of the narrative. Early in this century Cardinal Zurla wrote a lengthy work in favour of the voyages, but was so far from realising the fact that the Frislanda of the Zeno was the Færöe Islands, as is plainly demonstrable from internal evidence, that he concluded that it represented some island since submerged. Zach, Buache, Malte Brun, Walckenaer, de la Roquette, and the Polish geographer Joachim Lelewel, have all been advocates of the narrative. In 1845, the Danish antiquary, J. H. Bredsdorff, wrote a valuable paper on the subject in the third volume of 'Grönland's Historiske Mindesmaerker,' and has been more accurate and judicious than any of his predecessors in his conjectures and commentaries on difficult points. But what is wanted is not conjecture but demonstration, and Bredsdorff, in common with all the rest, has failed in detecting those simple facts connected with the history of the document which would have led to inevitable conclusions in its favour. The deniers of the authenticity of the document have been numerous, and even so late as the present year, the distinguished Professor Konrad Maurer has printed his opinion that the Zeno narrative is a compilation of Nicolò Zeno junior's from a variety of sources. But of all those who have thrown discredit upon the document, the most conspicuous is Admiral Zahrtmann, the late Hydrographer to the Danish Admiralty, who, in the year 1836, published in the fifth volume of our Society's Journal, an article of the most learned and elaborate character translated from the Danish, the object of which is to prove that the whole story is "false" and "a tissue of fiction," emanating from the pen of Nicolò Zeno junior, in 1558. It was said with great truth by a writer in the 'North American Review' for July 1838, after speaking of the various distinguished persons who have disputed or vindicated the credibility of this narrative:—"The most formidable assailant of the Venetian title to the discovery of the New World is yet to be named. The essay of Captain Zahrtmann of the Danish navy, originally published in the Transactions of the Royal Antiquarian Society of Copenhagen in 1833, and subsequently communicated to the London Geographical Society, is by far the ablest attempt ever made to shake the authority

of the voyages of the Zeni. We must say that our first impressions after perusing that masterly production, were so strong against even the possible truth of the account, that we well-nigh resolved to abandon the matter as beyond all hope of surgery without bestowing another thought upon it. The writer brings such a mass of *primâ facie* proof to bear upon the subject, and discovers so many loose points and apparent inconsistencies in the story, that the argument comes upon one with the force of demonstration. At the same time, the perfect freedom of the paper from vituperative remark, and the admirable coolness as well as skill with which the operator dissects his victim, are far from diminishing the effect produced upon the mind. A more careful examination, however, of this elaborate effort from the pen of so profound a scholar has suggested several ideas that detract, to some extent, from the conclusive character of the argument, and leave a ray of hope to the sanguine admirers of Venetian prowess." I trust that, if the reader will be pleased to follow me through this paper, it will be found that this "ray of hope" has now expanded into noon-day light. The result of my investigation has been to prove Admiral Zahrtmann, either in his facts or his deductions, wrong on every point, and to convict him of throwing upon an honourable man, occupying no less distinguished a position than that of one of the Council of Ten of the Republic of Venice, a series of aspersions of the most ungenerous character. The 'North American' reviewer just quoted commends Admiral Zahrtmann for refraining from vituperative remark. "Falsehood" and "tissue of fiction" applied to different parts of the narrative, are tolerably strong expressions, but, if true, would be justifiable in criticism. How different was the verdict of the illustrious and far-seeing Humboldt, who, with his usual large-mindedness, although he had perceived the difficulties attaching to the narrative of the Zeni, said, "On y trouve de la candeur et des descriptions détaillées d'objets, dont rien en l'Europe ne pouvoit leur avoir donné l'idée."—(*Examen Critique*,—tom. ii. p. 122.) True, the complications and difficulties which surround this narrative are such as amply to justify very serious doubts in the minds of those who have never made a special analysis of the subject. Admiral Zahrtmann, however, *has* devoted *very special attention* to such an analysis, and yet has failed to perceive the facts which should have averted such opprobrious epithets. Not the least important of these is, that, in fixing the localities written down by a Southerner, from the lips of Northerners, it is requisite to follow strictly the words of the narrative, and to see what names in the route tally, *not in form, but in sound*, with those written down. This has never been done.

Admiral Zahrtmann summarises his examination of the subject into the four following conclusions:—

"1. That there never existed an island of Frisland; but that what has been represented by that name in the chart of the Zeni is the Feröe Islands.

"2. That the said chart has been compiled from hearsay information, and not by any seaman who had himself navigated in these seas for several years.

"3. That the 'History of the Voyages of the Zeni,' more particularly that part of it which relates to Nicolò, is so replete with fiction, that it cannot be looked to for any information whatever as to the state of the north at that time.

"4. That both the history and the chart were most probably compiled by Nicolò Zeno, a descendant of the Zeni, who for brevity's sake may be called 'Nicolò Zeno junior,' from accounts which came to Italy in the middle of the sixteenth century, being the epoch when information respecting Greenland first reached that country, and when interest was awakened for the colony which had disappeared."

These propositions, and the arguments on which they are based, I propose to deal with in such order as shall seem best calculated to bring the series of details clearly before the mind, and will commence by transcribing the first proposition and its arguments *en bloc* just as they emanate from Admiral Zahrtmann's pen. The proposition stands thus:—

1st. "That there never existed an Island of Frisland, but that what has been represented by that name in the chart of the Zeni is the Feröe Islands;" and the following is Admiral Zahrtmann's argument:—

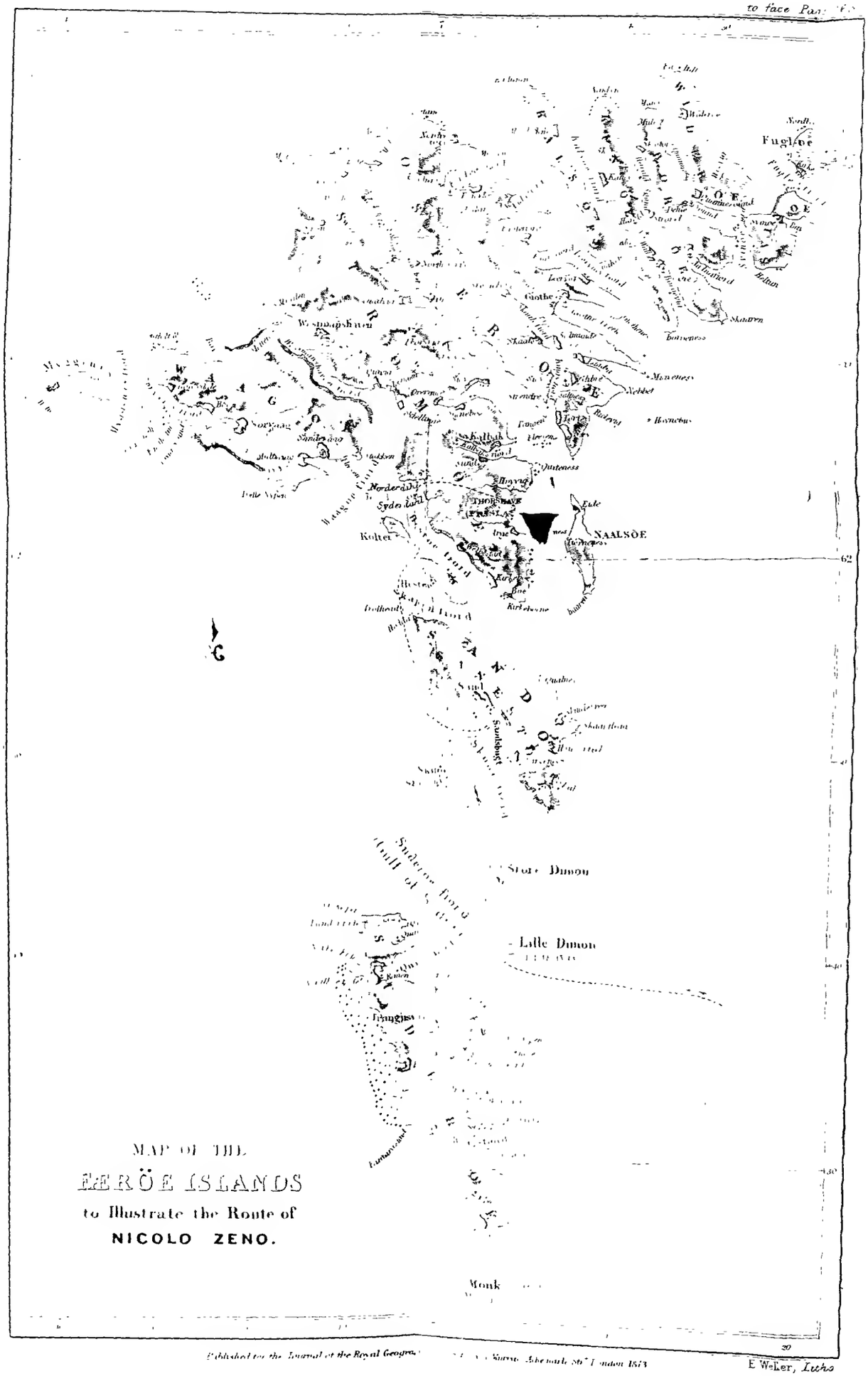
"1. The first point has already been proved by Buache, Eggers, and Malte Brun, by arguments which I shall not repeat, nor shall I relate the voyage itself,—a task already performed by various others. I shall only add a few remarks on the subject.

"Of the identity of Denmark, Norway, Sweden, and Scotland, there can be no doubt; as not only their relative positions, their outlines, and the names of many places in them, but also their proper names in Latin, are decisive proofs of this. Of the five groups, Greenland, Iceland, Shetland, the Feröe Islands, and the Orkneys, we recognise the proper names of the three which end in 'land'; whereas the two last, called in those days Fær-eyar and Orkn-eyar, are not to be found, these sounds being difficult to Italianise, or even to be at all caught or retained by any Italian ear. The name Gronlandia is applied, it is true, to quite a wrong place, where no land is to be found; but that the Engroneland in the chart, which in Antonio Zeno's account is

moreover called Gronlandia, corresponds with the present Greenland, is proved so evidently by its shape, that I cannot conceive how Eggers could entertain a moment's doubt on the subject, or could believe that it was land on the opposite side of Baffin's Bay; the more so, as it is now ascertained that in that bay there is no St. James's Island in existence. The identity of Iceland is proved not only by the name 'Islanda,' but further by the names of the bishops' sees, Scalodin and Olensis; that these two names, in particular, should be so easily recognised, and should bear so close a resemblance to the Latin names of the places, seems to indicate that the accounts respecting them were drawn from ecclesiastical sources. Though Shetland is called Estland, yet, in the first place, this is only a trifling transposition of the name in the spirit of the Italian language, and not exhibiting any greater deviation than is found in the other appellations given at different times to these islands, such as Hialtland, Yealtaland, Yetland, Zetland, and Hetland; and besides, we recognise so many uames here, that we are almost tempted to believe that this was precisely the part of the chart best known to the author. We find, for example, Cledere, *i.e.*, Queendal, Sumbercouit (Sumbergh Head), St. Magnus (St. Magnus Bay), Scaluogi (Scalloway), Bristund (Brassa Sound), Itlant (Fetlar), Lonibies (Lambness), Onlefort (Olna-Firth), and Oloford (Ouge-Firth). And, further, the placing of St. Magnus and Scalloway on the east side instead of the west side, naturally leads to the infereuce that these names were not copied from any other chart, but laid down from verbal depositions. These points being admitted, the Orkneys must naturally be looked for between Shetland and Scotland; and this Eggers has done, but in my opinion not in a very satisfactory manner. He supposes that the name Contanis may be assumed as Continent, or, in other words, Mainland, the largest of the Orkneys. I, on the other hand, consider beyond all doubt that it meaus Caithness (formerly called Katanes), the most northern county in Scotland, a province which, from the evidence of the ancient code of laws called the Grágás, we know belonged in the Middle Ages to the Crown of Norway. The only name I find to have a resemblance to any name in the Orkneys is Podalida, not unlike Pomonia, the principal island in the Orkneys, or Pentland (formerly Petland), the name of the strait which separates them from Caithness. Podalida corresponds with Pomonia in this respect also, that it is represented as a large island surrounded by several smaller ones. This, however, is not quite satisfactory: we have, therefore, two groups remaining unaccounted for, viz., the Orkneys and the Feröe Islands, one of which must of necessity be Frisland: unless we

would suppose that a seaman, who had for several years navigated the northern sea in all directions, should have remained ignorant of the existence of the Orkneys and the Feröe Islands, and at the same time known and laid down a country which has since disappeared, and of which, moreover, all the inhabitants of the north in those ages had ever remained in utter ignorance; this appears to me so very highly improbable, that we may safely pronounce it to be impossible. If we subsequently compare names and positions, we shall find that Frisland can be nothing else than the Feröe Islands; as the Rock Monaco, at the southern point, exactly corresponds to the position of the Rock Munk, in respect to the Feröe Islands, as the names Sudero Colfo, Streme, and Andefard must of necessity be considered homonymous with Suderö Sound, Strömöe, and Andefer; and, finally, as the absolute geographical position of Frisland corresponds better to that of the Feröe Islands, than is the case with almost any of those places on the chart concerning the identity of which no doubt can be entertained. The south end of Frisland, for example, is placed in the latitude of the Feröe Islands, whereas the northern extremity of Scotland is placed 2°, and all places in Greenland, Iceland, Shetland, Norway, and Denmark, are placed about 6° too far northward. In like manner, the eastern extremity of Frisland is laid down exactly as much to the westward of the Naze as the western extremity of the Feröe Islands is distant from that point; whereas Iceland is placed 10°, and Cape Farewell 20° of longitude nearer to the Naze than they really are. This was, therefore, the place which Antonio Zeno, who knew as little about Frisland as we do, would, according to his brother's description, be most likely to fall in with when he went in search of him. It is further mentioned, that Estland (Shetland) lies between Frisland and Norway, which is its relative position to the Feröe Islands; and, finally, it is expressly stated that Frisland was subject to the King of Norway; but as we know with certainty, from the Grágás Code, that no other islands were in this predicament than those now known to us, it follows that the country in question was the Feröe Islands."

With trifling exceptions, I freely accept all that Admiral Zahrtmann here says as true: true, but not as a proof of the falsehood of the voyages of the Zeni, but of exactly the contrary. It is quite true that there was no such island as Frislanda, but, from the names adduced by Admiral Zahrtmann himself as identical in Frislanda with those of the Færöe Islands, it is equally obvious that the Færöe Islands *were* represented by the Frislanda of the Zeno narrative and map. We must take things as we find them; and while imperfect geography on a map of the fourteenth



MAP OF THE

FERÖE ISLANDS

to Illustrate the Route of

NICOLO ZENO.

Published for the Journal of the Royal Geogra[illegible] Square, Albemarle St. London 1873

E. Weller, Lith.

or even of the sixteenth century, is no necessary proof of its inauthenticity, the occurrence of names thereon which can be found in no other contemporary map or document, but which agree with the known geography of to-day, is a very strong proof indeed of its authenticity. But I have still further evidence to adduce in proof that the Færöe Islands and Frislanda were identical. A description is given in the text of a voyage made by Nicolò Zeno to Frislanda to meet Zichmni on his return from a victorious progress through the country. By carefully following the text, we shall with great facility trace the route on a modern map, and realise the several points visited, and thereby, *for the first time*, remove the difficulties which have arisen from conjectures as to what those places could be, as represented by the quaint and distorted spelling given to them both in the ancient map and in the narrative. It is one of those cases which show that apparent trifles may prove of great moment. A more insignificant transaction than the passage which we are about to trace on the map of the Færöe Islands could scarcely be found in history, and yet it will go far to settle a difficulty which has perplexed the minds of some of the most distinguished literati of different countries in Europe. We commence the route without even a shade of uncertainty. The words of the narrative are, "They sailed to the westwards" (whence is not said, but the following words render the omission of no importance), "and with little trouble gained possession of Ledovo and Ilofe, and other small islands, in a gulf called Sudero." The adjoining map will show beyond all question that Sudero Gulf, or as we call it Suderoe Fjord, lies between the islands of Suderoe and Sandoe, and the islands described as Ledovo and Ilofe, &c., must of necessity be Lille Dimon, Store Dimon, and Skuoe; and we have no difficulty in understanding how the Venetian Zeno, hearing Lille Dimon uttered by a northerner, should give to the sound which he heard the form of "Ledovo." A very good suggestion has been made by Bredsdorff in his article on the Zeno voyages in 'Grönlands Historiske Mindesmærker,' that the "I" in Ilofe has been mistakenly written by Nicolò Zeno, junior, for an "S," and thus we may see that Skuoe easily becomes, when written down by the southerner, Slofe. The text goes on to say, that "in the Gulf of Suderoe, in the harbour of the country called Sanestol, they captured some small barks laden with fish." The harbour of Sandsbugt, in the island of Sandoe (Sanestol), corresponds exactly with the position and description of this unnamed harbour. The track thence is thus described: "Making their course still westwards, they came to the other cape of the gulf," which cape corresponds with the south-west point of Sandoe, as seen in the

modern map; "then turning again," that is, rounding the cape, and consequently proceeding northwards, "they fell in with certain islands and lands which they brought into possession of Zichmni. This sea was in a manner full of shoals and rocks." The course being now northwards, it is obvious that "the sea" mentioned is that between Sandoe and Stromoe, in which lie the small islets of Trothoved, Hestoe, and Kolter. After passing these, "the captain determined to land at a place called Bondendon," and the track which the fleet was now taking leads straight into the harbour of Norderdahl, the name of which there is no difficulty in supposing transmuted by the Venetian into Bondendon. There they awaited Zichmni's arrival; and after the recital of what occurred when he arrived, the narrative states that "departing thence they went in triumphant manner towards Frislanda, the chief city of that island, on the south-east of it, lying inside a bay in which there is such great abundance of fish, that many ships are laden therewith to supply Flanders, Britain (England, Scotland), Norway, and Denmark, and by this trade they gather great wealth." Now, knowing as we do the custom which obtained in the Middle Ages of giving to the capital of a country the name of the country itself, we can have little doubt that Frislanda was not the capital of the island only, but of the country to which that name was given; that is, the whole Færöe group; and in it we accordingly recognise Thorshavn, the position of which on the island of Stromoe precisely tallies with that of Frislanda in the narrative. Nearly every man in Thorshavn is a fisherman; and it is a very curious and significant fact that, whereas we know that in old times a considerable amount of commerce was carried on with Iceland from the English ports of Bristol, Scarborough, &c., we have here an indication that the Færöe Islands, which lay on the route from England to Iceland, were not omitted from that intercourse at the close of the fourteenth century. Even if Admiral Zahrtmann had not already satisfactorily shown that Frislanda and the Færöe Islands were identical, from the occurrence of such names as Andefjord, Stromoe, Monaco, &c., that fact would be conclusively established by the track which we have now been following; for even although any one should be disinclined to accept the suggested versions of the intermediate names, their individual and relative positions would nevertheless remain in harmony with the language of the text, while the entrance into the Gulf of Suderoe from the east at the commencement of it, and the position of Frislanda, the capital of the country, as the point of arrival at its close, correspond so exactly with the modern map as to leave no room for doubt. Now, when we turn from the Færöe Islands of the modern map

to the Frislanda of the Zeno map, of which the copy here given is a photographic facsimile, we find indeed a single island of preposterous size, possibly because it had to receive the largest number of names; but it will also be seen that, in spite of the abnormal delineation of the island, the places indicated in our route-track occupy exactly corresponding positions thereon.

As to the word Frislanda, as Admiral Zahrtmann, himself a Dane, tells us that in old Danish these islands were called Færöisland, the transmutation is by no means difficult. Meanwhile, the inevitable fact remains that the Færöe group *was* represented by Nicolò Zeno, senior, in the fourteenth century, by the word "Frislanda," and that the process, whatever it may have been, must have been easy, is proved by the fact that another Italian, the illustrious Christopher Columbus, wrote the same word down in exactly the same form in a note preserved by his son Ferdinand in his father's biography, where he says that, "in February 1477 I sailed a hundred leagues beyond the island of Tile, the southern part of which is not, as some will have it, sixty-three, but seventy-three, degrees from the equinoctial line. It lies much more to the west than the western meridian of Ptolemy. This island is as large as England, and the English, especially those of Bristol, go there with their merchandise. At the time that I was there the sea was not frozen, but the tide runs so high as in some places to rise and fall twenty-six fathoms. It is true that the Tile mentioned by Ptolemy lies where he says it does, and this is called by the moderns *Frislanda*."

Now it is quite useless to spend time in discussing the many geographical blunders embodied in this short note. It is quite sufficient that Columbus gives the word "Frislanda" in exactly the same form as Zeno does, and even mentions it as a generally recognised name, and since it has already been demonstrated that Frislanda and the Færöe Islands are identical, even though in Columbus's blundering note some sort of confusion has been made between Iceland and the Færöe Islands, his blunder does not do away with that identity. Meanwhile, the fact that he alludes to, of the men of Bristol carrying their commerce into those seas (it is well known that they traded with Iceland), presents to those who approach the inquiry in the spirit of seeking how the commutation of the word can possibly be explained, instead of how it cannot be, a very reasonable explanation of the difficulty; but as it has been objected by some that Columbus may have picked up the name from Zeno, it is necessary to state that not only were the three men—Nicolò Zeno, senior, of the close of the fourteenth century; Christopher Columbus, of the close of the fifteenth century; and

Nicolò Zeno, junior, the editor of his ancestor's work in the middle of the sixteenth century—perfectly independent of each other personally, but no one of them had the means of knowing the name as coming from any other of them. The Zeno story lay in the Zeno palace, unknown to anybody and unvalued, until found by Nicolò Zeno, junior, when he was a boy. He was born in 1515, and Columbus died in 1506. Nicolò Zeno, junior, published his ancestor's "Frislanda" in 1558, long before anybody had heard of Columbus's allusion to the same name; for the statement of the great navigator in which that name was mentioned was not given to the world till 1571, when the Italian version of his son Ferdinand's biography of his father was first printed.

But, in the above quoted arguments of Admiral Zahrtmann, we have seen not only names adduced which identify Frislanda with the Færöe Islands; but also similar evidence amply supplied from the map—but, be it observed, not from the narrative—of names establishing the identity of Estland with the Shetland group. There is also very good reasoning, indeed, respecting the Orkneys and Caithness, the correctness of which must be fully acknowledged. But to these reasonings I would wish to add some corroborative observations of my own.

It will have been observed that Zichmni is styled Lord of Porlanda and Duke of Sorano. The language of the text is, "He [Zichmni] was a great Lord, and possessed some islands called Porlanda, near to Frisland, on the south;" and "besides the said small islands, he was Lord of the Duchy of Sorano, lying off the land and facing towards Scotland." If we look to the Zeno map, we find the name Porlanda placed against some islands between Suderoe [which means the southern island] and the Monk. Now, not only do no such islands exist; but, as Zichmni sails *from* Porland, his own domain, to attack Frisland, it is clear that the former was not *in* Frisland, but has been placed there by Nicolò Zeno, junior, under a misapprehension of the meaning of the statement of the text that "it lay near to Frisland on the south."

We have to look elsewhere, then, for Porlanda; and the narrative tells us to look southward from the Færöe Islands and towards Scotland, where Sorano, another property of Zichmni, lay, and this points us direct to the Orkneys, which, it will be observed, are not laid down by their proper names, as we should have expected them to be on the Zeno map. We do, however, find "Podanda,"* which is placed in the very direction

* The cross-stroke of the "d" in this word is broken in the map, and looks like "rl," and was so read by Admiral Zahrtmann; but it is really "d."

indicated, and there can be little doubt that the "Podanda" of the map and the "Porlanda" of the text are identical, the "rl" of the one being easily mistakable by Nicolò Zeno, junior, for the "d" of the other. And now we shall see how this fits in with other facts. It is to the learned Johann Reinhold Forster that we are indebted for the valuable suggestion that Zichmni is the Venetian Zeno's rendering for Sinclair. It was in 1379 that Henry Sinclair of Roslyn was invested by Hacon VI., King of Norway, with the earldom of the Orkneys and Caithness. The declaration of Sinclair's fealty to the King is given entire by Torfæus in his 'History of the Orkneys,' p. 174. It will now be seen how Zichmni, Lord of Porlanda, is Sinclair, Lord of the Orkneys. But why Porlanda for Orkneys? In the absence of certainty I venture on a suggestion. Throughout the narrative this chieftain is never mentioned by his title, but always by his surname. When once, therefore, Zeno had made a note of the territorial possessions of this chief as they might chance to be communicated to him, there would arise nothing in daily intercourse to correct such memorandum if it were either inaccurate or inadequate. We will suppose, therefore, Zeno cruising in the Pentland Frith, which lies betwixt Sinclair's lordships of Orkney and Caithness, and he is informed by the sailors that he is now in the midst of the domains of his lordship. He thereupon takes note from their lips of the names of those domains as they lie respectively on the north and on the south. On the north he would have Pentland, which by misspelling, misreading from the old writing, or by Venetian transmutation, becomes, finally, Podanda or Porlanda; we have the island of Swona in the Pentland Frith (in exactly the position indicated by the text: "fra terra posta della banda verso Scotia"), which becomes written down in the text Sorano, and on the south we have Contanes, which is beyond all question Caithness, for it is found under that form in several other documents. It is necessary to dwell on the exact correspondence of Swona with the position of the Sorano of the text, in order to establish its identity in spite of the ridiculous epithet of "Duchea" which is attached thereto. Whether the use of the word originated in ignorance, or bombast,* or both, we must remember that the portion of the text in which it occurs was a compilation by Nicolò Zeno, junior, from the letters of his ancestral namesake; that the latter was ignorant of the language of the north, and would pick up his information with difficulty; and that epistolary correspondence

* The grandiloquence which could enlarge a rocky islet into a Duchy is a characteristic of the narrative which will be treated of more specially presently.

can scarcely be expected to embody the severe accuracy of history. The acceptance by many commentators of this most unquestionable blunder of placing Porlanda in the Færöe Islands has led only to confusion; whereas under this new suggestion a variety of unquestionable facts are brought into harmonious combination. But now that we have seen that the Zeno map possesses the merit of containing a variety of names of places in the Færöe group which we might hope in vain to find in any other map, even of the comparatively late period (1558) when it was engraved and published—places recognisable by the light of modern geography—let us turn and see what absurd blunders it exhibits in the misplacement of localities through the want of that light by Nicolò Zeno, junior, the very man to whom we are indebted for the document itself. It may be asked on what ground these blunders are attributed to him. The answer is very simple. They are all of the most preposterous character, unlike anything else on the map. They consist of *those names, and those only, which occur in the narrative,* and as the bearings in the narrative agree with modern geography, it follows, beyond all doubt, that the blunders have arisen from the misreading of it. The narrative gives an account of a second victorious campaign, this time directed against Estland, which it describes as lying upon the coast between Frisland and Norway, and which unmistakably, therefore, is Shetland. "Here they did much damage; but hearing that a fleet of the King of Norway's was coming to oppose them, they departed, but with such a gale of wind that they lost several of their vessels, and the rest were driven on a large but uninhabited island, called Grislanda, lying to the south." Nicolò Zeno, junior, misreading Esland for Iceland, places Grislanda off the south coast of that island, and, in pursuance of the same mistake, endows Iceland with a cluster of seven islands on its eastern coast, which will presently be seen to belong to Shetland. Now south of Shetland lie the Orkneys, the Mainland of which is called Hross-ey or Gross-ey, and just as the Færöe Islands or Færöisland became to Italian ears Frislanda, so would Gross-ey or Gross Island become Grislanda, and that this, whatever the process of derivation may be, is really correct we shall immediately have proof. News came that the enemy's fleet had been entirely wrecked in the said storm, and Zichmni seeing that the Shetlands (already described as lying between the Færöes and Norway, and called in the Italian "le Islande" in the plural, consequently not Iceland, but evidently "the Shetlands") *lay not far off to the northward* (exactly their position with respect to the Orkneys), resumed his purpose.

The first place that he approached was called Islanda, and

just as we have seen that the word "Frislanda" was used for the capital of Frislanda or the Færöe Islands, so we must infer that "Islanda" is here the capital of the "Islande" or Shetland Islands, wherever that may have been. Lerwick did not then exist. He found it so well protected that he removed his attack to the other islands in those channels, called the Shetlands, seven in number: Talas (Yelli), Broas (East and West Barras), Iscant (Unst), Trans (St. Ronan's Isle), Mimant (Mainland), Dambere (Hamna), and Bres (Bressay). He took them all, and built a fort in Bres, where he left Messire Nicolò with some vessels and men and stores, and he himself returned to Frisland. Now, there is no doubt that "Islanda" was a proper form for Iceland, and therefore eminently calculated to mislead Nicolò Zeno, junior, but it is hoped that from the position of the islands in question, between the Færöe Islands and Norway, from their description as lying "in those channels," from the correspondence of the individual names with the islands, and the plural generic name "le Islande" for the group, no doubt will be left on the reader's mind as to the "Islande" being the Shetland Islands and not Iceland, and that Grislanda occupies the position of Grossey in the Orkneys, the wild coast of which would give it the aspect of being uninhabited to any one driven on it in a storm. Yet it will have been seen that while the narrative is consistent with itself and with modern geography, the map places Grislanda to the south of Iceland, and the islands which have been identified with Shetland are engrafted on the east coast of Iceland. In this fact we have a proof that Nicolò Zeno, junior, the restorer of the map, is the cause of all the perplexity. But while this is a proof of his ignorance of the geography, it is the greatest proof that could be desired that he could not possibly have been the ingenious concocter of a narrative, the demonstrable truth of which, when checked by modern geography, he could thus ignorantly distort upon the face of a map.

Ignorance of the geography of the North in the middle of the sixteenth century cannot be looked upon as a reproach to him, but it had its consequences, and I dwell upon them because I claim the argument as a demonstration, now advanced for the first time, of the authenticity and truth of the original documents.

I venture to maintain that this proof is so conclusive that it could not be invalidated, even if we were unable to find a solution of some of the puzzles which the narrative and map present to us. Such, however, is happily not the case. We shall find that all of them can be met with explanations, based not on mere fancy or opinion, but on solid and substantial

arguments and facts; and the result is, that when we have once been able to detach that which is erroneous from that which is correct, we find that those portions of the ancient story which have not been marred by misreading, exaggeration, or unintelligent interference, are, with one exception, which will be spoken of hereafter, in harmony with the knowledge which we possess in the present day.

But we must not yet quit this subject of the attack upon Shetland, which the narrative would lead us to understand involved a conflict with the King of Norway.

Zahrtmann says on this subject: "As to the war asserted to have been waged between Zichmni and the King of Norway, this assertion is the less entitled to belief, from the circumstance that there was no king in Norway, that country being at that period under the government of Queen Margaret. Forster's opinion, that Zichmni might have been Henry Sinclair, Earl of the Orkneys, is altogether destitute of foundation; as that lord, on whom the said earldom was bestowed in 1380 [say rather 1379] by King Haagan, both in 1388 and 1389—as a Norwegian Councillor of State—signed the act by which Eric of Pomerania was acknowledged true heir of the realm, and therefore at that time could not have been in rebellion against the Crown. Neither is there any reason for supposing that his earldom, which comprehended Shetland, was in the meantime attacked and completely ravaged, and yet the Danish history make no allusion to any such circumstance; more especially when we again, in 1397, find that Jonas, Bishop of the Orkneys, signed in Calmar the coronation act of Eric of Pomerania, which shows that the connection between the islands and the mother country had continued without interruption."

This criticism of Admiral Zahrtmann's is perfectly just and reasonable from his point of view, a point of view most certainly, *primâ facie*, sanctioned by the language of the text. But is there no possibility that that language itself may not be perfectly correct? We have already seen how the editorial intervention of Nicolò Zeno, junior, introduced inaccuracies into the map, which have been a perplexity and a trap to commentators ever since. Now, no one can read the text without perceiving that while he has fortunately given us entire pieces of original matter, he has himself supplied the cement which binds the whole together.

We have also seen by the example of the map that he was capable of incorporating into his publication his own views of the facts related in the documents which he had before him; and yet there is no legitimate reason to doubt that this was done conscientiously. Now, as we shall presently see, the

narrative, as we have received it from him, exhibits beyond all contradiction a quality excessively misleading to the critic who takes each word *au pied de la lettre*, and that quality is hyperbole: yet no one it may be hoped, who is aquainted with the genius of the Southern mind, would condemn a tendency to a certain amount of hyperbole, especially in the record of the deeds of an ancestor, as involving any conscious want of integrity. At the same time, it is even quite possible that some or all of the inflation of the language may have existed in the original letter. Of this we have no means of judging. Nicolò Zeno, junior, we do know; Nicolò Zeno, senior, we do not, in regard of the sophistication, however blameless, of the matter which has reached our hands. But that hyperbole has been indulged in by the early Nicolò, or the later, or both, may be judged from the following sentence. When Nicolò's fleet reached Bondendon (Norderdahl), "they heard to their great satisfaction that Zichmni had fought a great battle, and put to flight the army of the enemy; in consequence of which victory, ambassadors were sent from all parts of the island to yield the country up into his hands, taking down their ensigns in every town and village."

It would be difficult to find in all literature a more striking example of grandiloquence and bombast in the description of so petty an occurrence. And yet it would be as unwise to condemn the reality of the scene, on account of the vividness of the colouring, as it would be to utter a sweeping condemnation of the hospitality of a Spaniard, because he places his house and all that he possesses at our disposal. Nevertheless, under the rigid exactness of criticism, this hyperbole has exposed the document to the gravest suspicions, simply because all hyperbole is a deviation from strict truth. Not only is the scantiness of towns and villages and population in the Færöe Islands utterly at variance with the strict letter of the above description; but the known gentleness of the people would lead, and to my own knowledge has led, to a denial of the truth of the story of the attack on Zeno, when first wrecked on their shores. I object to this denial on the grounds already advanced, and submit that as we have already had unanswerable proof of the general authenticity of the story, we must accept the exaggerations as merely the husk which surrounds a real and genuine kernel. Now it must be acknowledged that the elder Nicolò Zeno ran a great risk of imperfectly apprehending facts in the simple circumstance of his ignorance of the language of those amongst whom he moved. Whatever may have been the character of Sinclair's so-called triumphant expedition in the Færöe Islands, it appears pretty certain that there has been

great misapprehension on the part of Nicolò Zeno, senior, as to the motives of Sinclair's movements in the Shetland Islands, or else there have been both misreading and exaggeration on the part of Nicolò Zeno, junior, in dressing up the story.

Exaggeration is patent enough in the statements that "hearing that the King of Norway was coming against them with a great fleet to draw them off from this attack, they departed under a terrible gale of wind," and that "the King of Norway's fleet being caught in the same storm, was utterly wrecked." We can scarcely suppose the king to have acted in such a movement in person, or that his whole fleet was wrecked, and yet so notable an event be unrecorded in history. Exaggeration, however, is not the only difficulty in the way of our comprehending this attack on the Shetland Islands. Admiral Zahrtmann truly states that Sinclair's "earldom comprehended Shetland." Sir William Douglas tells us in his 'Peerage of Scotland,' p. 337, that the earldom had come into the family by the marriage of Henry Sinclair's father, Sir William Sinclair of Roslyn, with Isabelle, one of the daughters and co-heiress of Malise, Earl of Strathern, Caithness, and Orkney. The last Scandinavian Yarl was Magnus, the father of Malise's first wife. Among the charters of Robert III., King of Scotland, is one confirming a charter dated the 23rd of April, 1391, by Henry de Sancto Claro, Earl of Orkney and Lord of Roslyn, to David de Sancto Claro his brother, of the lands of Newburgh and Auchdale in Aberdeenshire, "pro suo homagio et bono servitio nobis impenso, et pro toto tempore vitæ suæ impendendo, ac etiam pro suo jure et clameo aliquali in partibus Orcadiæ seu Schetlandiæ sibi ratione Isabellæ de Sancto Claro, matris suæ, aliquo modo contingente."

By this we see that Shetland was included in the earldom, and we also see the ambiguous position in which Henry Sinclair stood with reference to the two sovereigns of Norway and Scotland.

It was from the King of Norway that Henry Sinclair had received in 1379 the recognition of his claim to the Earldom of Orkney, but his investiture was burdened with severe conditions. He was bound to serve the King with a hundred well-armed men whenever required, upon a notice of three months; to defend the Orkneys and Shetland against any invasion, not only with the native force, but with the whole power of his house; to assist the King when he attacked any foreign State; not to build any castles or ports in the islands without the royal consent, and to assist the King against the Bishop of Orkney, who belonged virtually to the Scottish Church, with other clauses which need not here be enumerated.

We have in the 'Orcades' of Torfæus, pp. 174–7, Sinclair's own Declaration of Fealty to the King of Norway, in which all these pledges on his part are fully detailed. If, therefore, we took the Zeno narrative *au pied de la lettre* as regards this attack upon Shetland, and understood it as a real conflict with the King of Norway, we should find ourselves in a dilemma from which it would be next to impossible to escape, for by such a transaction the earldom would be forfeited.

Now there is very strong reason for suspecting that, in the present case, exaggeration, employed only for the glorification of the occasion, has, from a foreigner's liability to misapprehend the true state of the case, led to the introduction of a false element into the story. Only let it be assumed that the same bombastic style of description which introduced armies and ambassadors and taking down of ensigns in every town and village of the poor and scantily peopled island of Stromoe, has with equal accuracy, in the present case, brought the King of Norway with a large fleet upon the scene of action, and our difficulty will disappear. I have an historical incident to adduce which will not only present a reasonable explanation of the mistake into which, under this assumption, Zeno would have fallen as to the political nature of the conflict, but it tallies both in time* and place with the Zeno story, and involves no infringement of Sinclair's fealty to the King of Norway. In Sinclair's Declaration of Fealty (Torfæus, 'Orcades,' p. 176) occurs the following passage: "We also promise that, since we have been already promoted by our Lord the King himself to the earldom and lordship aforesaid, our cousin Malise Sperre must cease from his claim and altogether lay aside his very claim itself, if it is decided that he has any, to the said lands and islands, so that our Lord the King, his heirs and successors, shall endure no vexation or annoyance from him or from his heirs."† Then, at page 178 of Torfæus occurs the following entry: "Anno MCCCXCI., Comes Orcadensis occidit Mallisium Sparrium in Hialtlandia cum septem aliis. Juvenis autem quidam cum sex aliis, navem sex (*sic*) scalmorum nactus in Norvegiam fugâ evasit." "In the year 1391 the Earl of Orkney slew Malise Sperre in Shetland, with seven others. A certain youth, however, with six others, procured a vessel at Scalloway and escaped to Norway." We

* The question of date will be fully dealt with a few pages farther on.

† Item promittimus quia ad comitatum, et ad dominium sæpefatum, per ipsum Dominum nostrum Regem sumus jam promoti, quod consanguineus noster Malisius Sperre cessare debet a jure suo, et ipsum jus suum omnino dimittere, si quod ad ipsas terras et insulas habere dignoscitur, ita quod Dominus noster Rex, hæredes sui vel successores, nullam ab eo, aut ab ejus hæredibus vexationem vel molestiam sustinebunt.

have seen how the earldom passed by marriage from the old Scandinavian yarls into the house of Sinclair, and the name of Sinclair's cousin, Malise Sperre, is suggestive that he was of the Norse side of the family, and that in that capacity he put in the rival claim to the inheritance, of which Sinclair himself speaks. Torfæus does not inform us of the immediate cause of the conflict in which Sperre was slain by Sinclair in Shetland, but there can be little doubt that that cause was the disputed lordship of Shetland, and that Sinclair, in the incident recorded by Zeno, was taking possession *de facto* of that which he already possessed *de jure*, while his contests with his Norse rival would easily bear to Zeno's intelligence the aspect of a conflict with Norway. It must be borne in mind that the authenticity of the Zeno document being now fundamentally established, we are not called upon to do more than show the *possibility* of any of the facts related, but in the incident just recited it must be allowed that we have a case not of possibility only, but of the highest probability.

We now come to Admiral Zahrtmann's second proposition, which is couched in the following terms: "That the said chart has been compiled from hearsay information, and not by any seaman who had himself navigated in those seas for several years." The last clause of this proposition, of course, must be understood to mean, "was not laid down from actual survey." Quite true. Now, seeing that it was compiled from hearsay information; that it supplies us with names of places in the Shetland group, and in the Færöe Islands, &c., remarkably in advance of what is laid down on any map, even of the comparatively late period of Nicolò Zeno, junior's, publication in 1558; what could we ask for more in harmony with the statement of the latter in that publication, viz.: "Of these north parts I have thought good to draw a copy of the sailing chart, which I find that I still have amongst our family antiquities, and although it is rotten with age, I have succeeded with it tolerably well"?

When Admiral Zahrtmann recognises that "the old forms of Fær-eyar and Orkn-eyar, which are not found on the map, are difficult to Italianise or even to be at all caught or retained by any Italian ear, and that names are transposed in the spirit of the Italian language," and when he draws the just inference that these names were not copied from any other chart, but laid down from verbal depositions, how can that inference be other than confirmative of the fact that the map, "rotten with age," contained these names as they were received from Northern tongues by the Zeno of the fourteenth century, and written down by him or them after being distilled through the alembic of a Southern mind? If this map had been a compilation of Nicolò Zeno,

junior, from any other chart or charts, this phenomenon would not have been exhibited, but the names would have been copied from the Northern sources in their native Northern form. But it must never be forgotten that the old chart *was* "rotten with age," that Nicolò Zeno, junior, had "drawn a copy of it," and, as he flattered himself, "had succeeded with it tolerably well." It is clear that in this attempt, having a desire to remedy the damages of the old chart and to make his copy as complete as possible, he had recourse to the narrative for guidance; but, unhappily, not possessing maps at that early period which could set him right when he misread the narrative, his very laudable effort resulted in the most deplorable confusion, and has, in fact, been the cause of very nearly all the doubts and discussions and disbelief to which this ill-starred document has given rise. Hence, we have on the face of the same map two opposite realities—good geography, in advance even of the period at which it was published, side by side with the most preposterous blunders. But the explanation is manifest, the good was of the fourteenth century, gathered by the ear on the spot; the bad was of the sixteenth century, misapprehended from the ancient narrative.

We now come to Admiral Zahrtmann's arguments on his second proposition: "That the said chart has been compiled from hearsay information, and not by any seaman who had himself navigated in those seas for several years."

"As to the second point," he says: "it is in the first place hardly credible that a seaman acquainted with the navigation of the Northern Seas should have assigned so incorrect a relative position to the different places. For example, that Shetland (from which may be seen the Orkneys, lying close under the coast of Scotland) should be represented as situated near Norway, far distant from Scotland, and without any intermediate islands. The same fault, however, is found, to a greater or less degree, in all the maps published in the sixteenth century, which shows that the chart of the Zeni is, in this respect, a copy. We are perfectly acquainted from the Landnama-Book with every particular of Iceland in the thirteenth century, and we know that it was then just the same as now; how, then, is it possible that a seaman, who had resided there for so long a time, should represent it like an archipelago of several considerable islands? How could he have remained ignorant of the native names of the places, particularly of the harbours, and have only learned the Latin names of the island and its two dioceses? How could he give it a shape which, though it is called by Malte-Brun, in his 'Précis de la Géographie universelle,' "bonne à l'exception de la partie Nord-Ouest," in truth resembles any

other place as much as Iceland? How could he lay down to the north-east of Iceland a continent upon which he pretends to have been, when we know that in that direction there exists no continent, but only the island of Jan Mayen? And finally, how could he have been in the Feröe Islands, and yet represent them as one large island surrounded by some smaller ones? The whole chart bears the most palpable marks of having been compiled by a person who had never been at the places themselves, and who knew nothing of either the language or the history of the North; for the Sagas and Sailing Directions prove that in those days the inhabitants of the North had much juster ideas of the relative position of places, and that they knew, for example, that a line drawn from Bergen, between Shetland and the Feröe Islands, would pass about 60 geographical miles to the southward of Iceland. The chart is dated 1380, an epoch at which Zurla has proved that both Nicolò and Antonio Zeno were in Italy; which shows that they had not drawn the chart at the places themselves,—for as to the possibility of their having antedated it, it is to be presumed that in those days there was as little inducement as there is now for the framer of a chart to publish it as older than it really was. Finally, the comparative correctness of the delineation of Denmark and Norway is the best proof that the chart was not drawn in 1380, but about the middle of the sixteenth century. Zurla himself mentions that in the Isolario of Benedetto Bordone, published at Venice in 1534, Norway and Greenland are very erroneously laid down,—a topic to which we shall have to return hereafter. The exiled Archbishop of Upsala, Olaus Magnus Gothus, published at Venice, in 1539, a map of the three Scandinavian kingdoms, which I have not seen, as it appears doubtful whether any copy of it remains in existence; but undoubtedly this map, and those published at Antwerp, particularly those of Ortelius, were the first that gave a tolerably correct representation of these countries, an accurate knowledge of which it was impossible for the Zeni to have procured at any of the places visited by them, viz., Frisland, Estland, Iceland, and Greenland."

With what has been already written present to his mind, the reader will be able, it is hoped, to see how, with the exception of the date, which will be dealt with presently, answers can be given to the objections here brought against the authenticity of the map. He will be able to see, what Admiral Zahrtmann did not see, that Iceland is, in truth, not brought into question at all in the part of the narrative under review, but that Nicolò Zeno, junior, through misreading the name, mistook Shetland for Iceland, and added to the latter the names belonging to the former. We cannot answer for how much of the map may be

due to his handiwork, but of this we may be sure, that information therein, which was in advance of the knowledge of his day, and coincident with the knowledge of our own, was derived from the early visit to the spot, while deviations from correctness, even though not his own, are no proof of inauthenticity in a map of the fourteenth century.

The remainder of Admiral Zahrtmann's facts, comments, and insinuations, are not so categorically arranged, but I have analysed them all, and for the sake of clearness have grouped them in the order in which they bear upon the narrative and its publication.

"It cannot be denied," says Zahrtmann, "that the story has been composed with great ingenuity, but still it contains contradictions. We may ask, for example, how was Nicolò Zeno informed that Antonio spent fourteen years in Frisland, when no mention is made of this either in the last complete letter, or in that fragment which was the last discovered, and in which he says he has only made some alterations in the style and the obsolete expressions, but not in substance? If it was from the dates of the letters, he certainly could not mistake ten years in fixing the epoch when the voyages were performed. Neither is it to be believed that in a family like that of the Zeni, where not less than three, viz., Jacopo, Nicolò, and Pietro, each in his century, published descriptions of the exploits of their ancestors, the children should have been suffered to destroy the family archives, or that records similar to Antonio's description of the North should have been left unnoticed and unpublished for more than a century—at a period, too, when Columbus's transcendent discovery attracted universal attention to the West. That the family could not have been ignorant of their contents is proved by the circumstance of Nicolò knowing what he had destroyed, which, as he himself was a child at the time, he could only have learned at a later period from his parents. Allowing, however, that Nicolò, when a child, did really destroy the work of his own direct ancestor, Antonio, it still remains to be explained how he had it in his power to destroy several of the letters, they being all addressed to Carlo, the most respected of the brothers, who survived all the rest, and whose direct descendants did not become extinct till a whole century later: viz., in 1653. Even supposing that the whole of the family archives were deposited with the senior branch, the chance of their falling into the younger Nicolò's hands remains as unlikely as ever, inasmuch as he was descended from Antonio, the second son, whose elder brother's lineage was not extinct before the year 1756."

The reply to all which is, that whatever part of American

soil may be referred to in the Zeno narrative, it was in no sense connected by Nicolò Zeno's ancestors with the idea of a transatlantic world, for it had been only regarded as a continuation of Europe. We could ask no better proof that his parents did not attach this extreme value to these papers than the fact that they did not secure them from being torn up by a child, and it is clear that neither then nor afterwards could they communicate to him what they had no idea of themselves. Comparatively unimportant, however, as these papers would, therefore, in this sense, be to them, it is most easy of belief, and most natural, that Nicolò's father or grandfather should have received from a cousin, one of Carlo's descendants, the letters addressed to Carlo, simply as describing the exploits, whatever their value, of his own direct ancestor. When, however, Nicolò Zeno approached manhood, North America began to be known, and hence the recognition by him of the value of the papers which had lain hitherto neglected in the palace. That family papers, more or less important, may fall into a child's hands and be destroyed or damaged, is too certain to need of argument; and the chances and changes of this mortal life have not, we may suppose, been sent to all God's creatures to the single exclusion of the Zeno family.

Admiral Zahrtmann raises a great question as to which of three Nicolò Zenos mentioned in the Venetian Annals at the close of the fourteenth century was the hero of the voyages. There need be no question at all on the subject. Nicolò Zeno, junior, tells us in his genealogy at the beginning of the narrative that his own direct ancestor Antonio, and Nicolò the Cavalier, the heroes of the voyages, were brothers of the famous Carlo, who, in 1382, saved the Republic, and thereby so much increased the reputation of the family. This Nicolò the Cavalier was, for distinction's sake, called "quondam Ser Dracone," and in Muratori's 'Rerum Italicarum Scriptores,' tome xxii. p. 779, we find him mentioned by this same designation as one of the three syndics who were elected on the 14th December, 1388, to take possession of the city of Treviso. After this date, however, no mention of him occurs in the Venetian Annals, and as we are told in the Zeno narrative that he died while out in the North, a victim to the climate, Cardinal Zurla very justly says that this silence respecting him in the Annals is in conformity with the fact that he was away from his country and engaged in the voyages as represented. We have, therefore, no room left for doubt as to his identity. But, this being so, it is evident that the date of 1380, given both in the text and on the map, must be erroneous, and we shall presently see from other evidence that such in very truth is the case, and that the date has really

to be placed ten years later. In dealing with this discrepancy of ten years in fixing the epoch when the voyages were performed, Admiral Zahrtmann's indictment against Nicolò Zeno, junior, takes the following shape.

"According to Cardinal Zurla," he says, "Nicolò cannot have left Venice till 1390, and it is certain that in 1406 Antonio was already dead. Of that interval Antonio is said to have spent fourteen years in Frisland. There remain, therefore, scarcely two years for Nicolò to have completed his perilous voyage, to have been wrecked, to have made his first brilliant campaign, ending in the conquest of Frisland, and to have reported it to Antonio (whom he actually induced to perform the voyage from Venice), and finally to have died there, and all within the interval of two years. Even nowadays this would scarcely be possible."

I cannot but express my amazement at such an assertion. Suffering shipwreck is usually not a lengthy process. The brilliant campaign in Frisland, which we have followed in the preceding pages, must have been a very lazy operation if it occupied a week; so that if we deduct these events from two years, there will be left "ample space and verge enough" for the two voyages out and the transmission of a letter between, and a great deal of time to spare into the bargain. To call the crowding of these events into two years an impossibility is simply absurd. On the strength, however, of such assumed impossibility Admiral Zahrtmann proceeds to say:—

"Yet it is on the authority of Antonio's letters, which Nicolò Zeno, junior, pretends to have had in his possession, that he has written this narrative. From the same letters he must have drawn his dates, and a solitary error in this respect could easily have been detected, as there were several letters. Now, as the dates of these letters correspond exactly with the time at which Zurla has clearly proved that the brothers were in Italy, it follows that the letters from Frisland were either fabrications or that they never existed."

The date of 1380, it is true, stands in Roman numerals on the Zeno map, and is written out in full in the narrative. But facts are stubborn things, and if we conscientiously and industriously resort to them instead of to preconceived conclusions, we shall generally arrive pretty near the truth at last. Admiral Zahrtmann elsewhere shows his perfect knowledge of a remarkable fact, which, if he had been as anxious to find where Zeno was right, as where he might be made out to be wrong, would have rectified the above error of 1380, and neutralised all the arguments that he founds upon it.

A relative of the family, named Marco Barbaro, wrote, in

1536, a copious work, entitled 'Discendenze Patrizie,' on Venetian noble families, and in the genealogical table of the Zeno family makes the following entry under the name of Antonio Zeno. 'Scrisse con il fratello Nicolò Kav. li viaggi dell' Isole sotto il polo artico, e di quei scoprimenti del 1390, e che per ordine di Zieno, Re di Frislanda, si portò nel continente d'Estotilanda nell' America settentrionale, e che si fermò 14 anni in Frislanda, cioè 4 con suo fratello Nicolò e 10 solo." "He wrote with his brother, Nicolò the Cavalier, the voyages of the islands under the Arctic Pole, and of those discoveries of 1390, and that by order of Zieno, King of Frisland, he went to the continent of Estotiland in North America. He dwelt fourteen years in Frisland, four with his brother Nicolò and ten alone." Cardinal Zurla first mentioned this fact, and I have verified it, by procuring an extract of the entry from Venice, through the kindness of my distinguished friend Mr. Rawdon Brown. Admiral Zahrtmann adverts to it, solely to make the following insinuation :—

"It must be observed," says he, "that this work is a manuscript, and that it is therefore impossible to decide when or by whom any article in it was written, and as the families of Zeno and Barbaro were related to each other and on most friendly terms, Nicolò Zeno, who was the firstborn of the family, might very well have been intrusted with the drawing up of the family genealogy"—implying thereby that little trust was to be placed in a statement possibly drawn up by one whom he, Admiral Zahrtmann, had mentally condemned as an impostor. But here he overshot the mark. There is little doubt that Barbaro *did* derive this statement from Nicolò Zeno, who had so nearly, but not quite, destroyed, when a boy, the old papers on which it was based. But in drawing up the said statement Nicolò Zeno showed that he was cognisant in 1536, two-and-twenty years before the Zeno narrative and map were printed, of that true date of 1390, which coincided exactly with the evidence of the annals of his country.

If both the dates 1380 and 1390 emanated from him, one was clearly a mistake, and as we can have no doubt which was the erroneous one, we have in the error itself, whether made through carelessness in either one or both cases by Nicolò, or by the printer, or by the engraver, a proof that Nicolò was not at least the subtle and ingenious concocter of falsehoods that Admiral Zahrtmann would represent him to be. Nicolò Zeno held the high position of Member of the Council of Ten of the Republic, and had all his country's annals at his command. As the historian of his family, he had those annals intimately within his own coguisance. Did it never, therefore, strike Admiral

Zahrtmann, that if Zeno had been the cunning and laborious impostor he would make him to be, there was nothing he would more carefully have avoided, or could have avoided with greater ease, than the lapsus of giving an enemy the opportunity of proving an *alibi* against his ancestors in the matter in question? The conclusion is evident therefore that 1380 was an error, and when it is considered that this date is written above the map in Roman numerals, thus: MCCCLXXX, it will be seen how easily that easiest of all delinquencies either of the author, the editor, or the engraver, viz,—the dropping of a final X, may have occurred. The short sentence in the narrative "this was in one thousand three hundred and eighty," most certainly occurs in a part written by Nicolò Zeno, junior, and the legend at the top of the map is manifestly by him also, so that there is a common origin for both. How the blunder may have occurred, however, is all conjecture, but enough has been said to prove that *it was* a blunder; and it may well be asked whether, on the strength of such an accident, a nobleman of high and ancient lineage, the members of whose family had many of them so eminently distinguished themselves in the history of their country as to stand in no need of falsehoods to add to their glory, himself a Member of the Council of Ten, is to be branded as a concocter of falsehoods?

That there is reason in my suggestion about the possible dropping of an "X" in the date is shown by a remarkable fact. The great Antwerp geographer Ortelius, in recording this very narrative, copied the Roman numerals as they stand at the top of the map, making 1380, yet when our Hakluyt produced the same story on the authority of Ortelius, he gave the date of 1390, thus proving by a converse blunder how easily this kind of error may occur.

But now that we have 1390 for Nicolò Zeno's arrival in the Færöes, and 1391 for the exploits in the Shetland Islands (see ante, page 173), in which Antonio was present, there are but three transactions to be accounted for in the interval, the attack on the Færöes, the transmission of Nicolò's invitation, and Antonio's voyage out, and to say that a year and a half, and possibly more, was not sufficient for all this, would be an absurdity. With these dates also before us, we see that ample time is left for Antonio's sojourn of fourteen years in the North, his return to Venice, and death before 1406.

We will now pass on to another example of the manner in which the truthfulness of Nicolò Zeno, junior, is impugned by Admiral Zahrtmann. Most geographers have heard of the famous collection of Voyages and Travels made by the illustrious Ramusio. Now because the Zeno narrative, which was

published in 1558, was not inserted in the first edition of the second volume of Ramusio, published in 1559, Admiral Zahrtmann would insinuate that this showed a mistrust in Zeno's probity, but as Ramusio died in 1557, it is difficult to see in what earthly way this omission could imply any want of confidence on his part.

"In the third edition of 1574, however," says Zahrtmann, "the voyages are adopted to their full extent, together with their splendid descriptions of the riches of Estotiland, which last part of the story, however, it was thought fit to leave out of the fourth edition, published in 1583, Frobisher having in the meanwhile performed his voyages and, as we all know, without finding any gold."

Now although Frobisher mistook Frisland for Greenland, and assumed the existence of a strait which his subsequent voyages showed to be a mistake, this was not Zeno's fault, and what Zahrtmann says of the consequent *alteration* in Ramusio is simply not the fact. Instead of the omission in the 1583 edition being an intentional one, as it would have been if it emanated from the editor, it is merely a case of a whole line, neither more nor less, having fallen out by the printer's carelessness, the full page in the 1574 and 1583 editions exactly tallying, with the exception that the former has 54 and the latter only 53 lines, in consequence of the accident in question. The absence of intention is shown by the utter nonsense, resulting from this omission, in the sequence of the language. The passage runs thus, the line in brackets being that which was printed in the previous edition of 1574 and in conformity with the Zeno text, but which has fallen out in the 1583 edition:—

"Hanno lingua e lettere separate, e cavano [metalli d'ogni sorte, e sopra tutto abondano d'oro, e le lor pratiche sono in Engroneland] di dove traggono pellereccie e zolfo e pegola."
"They have a separate language and letters. They dig up [metals of every kind and abound in gold. Their commerce is with Greenland] whence they receive furs, brimstone, and pitch."

Let the reader join the two lines between which the omission occurs, and judge whether the editor of Ramusio adopted that mode of showing his mistrust of the Zeno narrative. It is true that Admiral Zahrtmann adopts this mare's-nest from the words of Mr. Biddle, the American author of the anonymous memoir of Sebastian Cabot, but it is difficult to believe that one who was so anxious to show that Ramusio mistrusted Zeno, and who was so intimately acquainted with the editions of Ramusio's work, should not have had a copy of that work by which he might verify the point for himself. One thing is certain, that

it was a bounden duty, both in Biddle and Zahrtmann, before putting forth this insinuation against the credit of Zeno, that each should have made sure for himself that it was founded on a right basis, whereas the reader has seen that the proof of the exact contrary lay open to view on the very surface.

But I must not here detain you with the different attempts that Admiral Zahrtmann has made to impugn the truth of Nicolò Zeno. A refutation of them all will be found in the volume which I am editing on the subject for the Hakluyt Society. I will merely here remark that one of Admiral Zahrtmann's principal endeavours was to show that Nicolò Zeno was mistrusted by his fellow-citizens.

In one place, however, Admiral Zahrtmann says that Zeno was so great a proficient in geography, that his own countrymen looked upon him as the greatest geographer of his time; but here the writer in the 'North American Review,' who was so impressed with Admiral Zahrtmann's "masterly production that he well nigh resolved to abandon the matter as beyond all hope of surgery," takes courage, and very justly says: "We shall not allow our nautical critic to blow hot and cold in the same breath; in one passage to give the noble Venetian the benefit of the respectability he enjoyed as a man of science, and in another, when it better suits the drift of his argument, to deny him the favourable estimation of learned men among his contemporaries." Of the estimation in which Nicolò Zeno was held for probity there can be no doubt. That his geographical knowledge may, for the period in which he lived, have been very respectable, is quite possible, and the really valuable map which came down to him from his ancestors may have enhanced his credit in that respect; but in very truth, he had no means from without, except the narrative, whereby to check the geography of the map, and none at all whereby to check his own misconceptions of the geography of the narrative.

After the affair in Shetland, Earl Sinclair left Nicolò Zeno in a fort which he had built at Bressay, with some small vessels, and men, and stores; and in the following summer, Zeno resolved to try his fortune in a voyage of discovery. He fitted out three small barks in the month of July, and sailing north, arrived in Engroneland or Greenland.

Here he found a monastery of Friars Preachers, and a church of St. Thomas, close by a volcanic hill. There was also a hot water spring, which the monks used for heating the church and the entire monastery, and by which they cooked their meat and baked their bread. By a judicious use of this hot water, they raised in their small covered gardens the flowers, fruits, and herbs of more temperate climates, thereby gaining much respect

from their neighbours, who brought them presents of meat, chickens, &c. They are indebted, the narrative says, to the volcano for the very materials of their buildings, for by throwing water on the burning stones while still hot, they convert them into a tenacious and indestructible substance, which they use as mortar. They have not much rain, as there is a settled frost all through their nine months' winter. They live on wild fowl and fish, which are attracted by the warmth of that part of the sea into which the hot water falls, and which forms a commodious harbour. The houses are built all round the hill, and are circular in form and tapering to the top, where is a little hole for light and air, the ground below supplying all necessary heat. In summer time they are visited by ships from the neighbouring islands and from Trondheim, which bring them corn, cloths, and other necessaries in exchange for fish and skins. Some of the monks are from Norway, Sweden, and elsewhere, but most of them from Shetland. The harbour is generally full of vessels, detained by the freezing of the sea, and waiting for the spring to melt the ice. The fishermen's boats are like a weaver's shuttle; they are made of the skins of fish, and sown together with fish bones in such a manner, that, in bad weather, the fisherman can fasten himself up in his boat and expose himself to the wind and sea without fear, for they can stand a good many bumps without receiving any injury. In the bottom of the boat is a kind of sleeve tied fast in the middle, and when water gets into the boat they put it into one half of the sleeve, close it above with two pieces of wood and loose the band beneath so that the water runs out. The friars are liberal to workmen, and to those who bring them fruit and seeds, so that many resort to them. Most of the monks, especially the principals and superiors, speak the Latin language. And this is all that is known of Engroneland, as described by Messire Nicolò Zeno.

This interesting story brings us to the much-vexed question of the site of the old Icelandic settlements in Greenland.

Until the first quarter of the present century the almost universal opinion was in favour of the east coast opposite Iceland. There was much to encourage this conclusion. The names of the two settlements, Ostrebygd and Westrebygd, easily led to the supposition that the former was seated on the east and the latter on the west coast of Greenland. The prevalent idea too, on the part of Icelanders in general, that this was the case, as well as certain expressions in the ancient itineraries, when separately considered, seemed to lead very forcibly to the same conclusion. The story of the Icelandic colonisation of Greenland may be summarily stated as follows: In the beginning of the

tenth century, Gunnbjorn, the son of Ulf Krake, a celebrated Norwegian rover, discovered at some distance due west from Iceland some large rocks, which he named after himself, Gunnbjornarsker; and, in the same voyage, he also discovered still further to the west an extensive country, but on which he does not appear to have landed. No attempt to explore this region was made for a very long time, but the report of the discovery was preserved in Iceland, and at length Erick the Red, son of Thorward, a Norwegian Jarl, who, together with his father, had some years before been compelled to flee to Iceland, after his father's death was himself outlawed for murder, and resolved to seek the land which Gunnbjorn had seen, and promised to return with tidings if he discovered it. In 982 he sailed west from Sneefeldsnaes and found land, which from its height he called Midjokul, near the place afterwards known as Blaeserk or Blue Shirt. Thence he sailed along the shore in a southerly direction, seeking for the nearest habitable land. The first winter he passed in Erickseya, near the middle of what was afterwards called the Ostrebygd or eastern colony. The following year (A.D. 983) he came into Ericksfiord, where he fixed his abode. The same summer he explored the western desert and gave names to many places. In 985 he went to Iceland, and in the summer of 986 began to settle the land which he had discovered, which he called Greenland, because he said that the people would not like to move thither if the land did not have a good name. Colonists followed in considerable numbers, and the chiefs gave their own names to the bays and capes which they occupied, following the example of Erick, who dwelt at Brattahlid in Ericksfiord. In the year 999, Leif, Erick's son, sailed to Norway, and passed the winter at the Court of King Olaus, who was zealous in propagating the Christian faith. Leif received baptism, and the next spring introduced Christianity into Greenland, taking with him a priest and several monks to Brattahlid. In course of time churches were built, and in the twelfth century the number of Christians had multiplied to such an extent, that they resolved to endeavour to obtain a bishop of their own, and in 1126 Bishop Arnold came to Greenland, and set up the episcopal seat at Gardar. From the Gripla we learn that Gardar was at the bottom of Ericksfiord, in the East Bygd, and there was a church there dedicated to St. Nicholas. There were twelve churches in the East Bygd and four in the West Bygd. The Episcopate continued till the beginning of the fifteenth century, Professor Finn Magnussen having shown that Andreas, the late Bishop, officiated in the Cathedral at Gardar in 1409; but after this period, communication with Norway and Iceland seems to have been almost entirely given

up. An event, however, had occurred in 1349 of great interest to our subject, not only as regards the fate of the colony, but the information with respect to its position, which we derive from a contemporary chronicler. In that year a descent was made by the Skrellings, or Esquimaux, upon the West Bygd, and it so happened that Ivar Bardsen, a Greenlander, who had been for many years steward or lay justiciary to the Bishop of Gardar, was sent to convey succour to the sister colony, and to drive away the Skrellings. He found, however, on arriving there, neither Christian nor heathen, but only some cattle running wild, which his people took on board their vessels and returned home. Of this occurrence, Ivar Bardsen has himself left a record in a document of very great importance, of which more will have to be said presently.

There is yet another document extant which throws light upon the subsequent fate of the abandoned colonists. A letter of Pope Nicholas V. to the Bishops of Skalholt and Holar in Iceland, dated 1448, discovered by Professor Mallet early in this century in the Papal Archives, tells us that the Christians had maintained for many centuries the Christian faith, established by King Olaf in Greenland, and had erected many churches and a cathedral, until, about thirty years ago (*i.e.* about 1418), some heathens from the neighbouring coasts came upon them with a fleet, and laid waste the country and its holy buildings with fire and sword, sparing nothing but the small distant parishes, which they were prevented from reaching by the intervening mountains and precipices. The inhabitants of both sexes they carried away into slavery. What became of the remnant of the colony of the East Bygd is a mystery. Either like their brethren of the West Bygd, they may have been exterminated by the Skrellings, or may have mingled with the Esquimaux, and adopted their manners and customs. At any rate, the consequence was that Greenland was for a long time forgotten, until at the beginning of the sixteenth century, Erick Walkendorf, Archbishop of Trondheim, took pains to collect together all the ancient accounts concerning it that he could, and submitted to the Government a proposition for the re-discovery of the lost colony. Unfortunately, however, before his plan was developed, he fell into disgrace with the King, and was banished to Rome, but subsequently died at Amsterdam, in 1523. Since his time a great many expeditions have been sent out by the Kings of Denmark in search of the colony. In the reign of Frederick II., Magnus Heinesen went out in 1578. In the long reign of Christian IV., from 1588 to 1648, were sent out the expeditions of Godske Lindenow, and Carsten Rickardsen,

and Jens Munk: but all these attempts were fruitless, as far as concerned the discovery of Greenland to the east of Cape Farewell. The voyages of David Danell, in the reign of Frederick III., however, furnish some useful data about the East Coast. At length, in the beginning of the eighteenth century, Hans Egede, a Norwegian clergyman, regardless of ridicule or hardship, persuaded Frederick IV. to send him out as the missionary priest of a new colony to be established in Greenland. His judicious conduct secured him the confidence of the natives of the West Coast; but being convinced that they could not be descendants of Europeans, he determined on visiting the East Coast, and set out for that purpose with two barges on the 9th of August, 1723, but for want of sufficient necessaries was obliged to put back on reaching lat. 60° 20′. Between the 60th and 61st degrees of latitude he discovered at Kakortok, in what is now called Julianashaab, a remarkable ruin which proved that the Icelanders had formerly been there. In 1728 Major Paars and Captain Landorf were ordered to ride on horseback from the West Coast to the East, but, as may be supposed, with little success. In 1752 Peter Olsen Valloe with four other Europeans in a Greenland skin-boat explored several of the fjords in the district of Julianashaab, and gave a description of some of the many ruins to be found there. He succeeded in reaching the southern shores of the East Coast in lat. 60° 28′. The expeditions of Lôvenörn in 1786, and of Paul Egede and Rothe in 1787, were equally unsuccessful in attaining the desired object. Not more successful than the Danish voyagers were our own great navigators, Davis, Hudson, and others, who aimed at the solution of this problem. The attempt to approach the land on the east appears to have been abandoned as hopeless, until Captain Scoresby showed that even in such high latitudes as between 70° and 75° N., the coast was not altogether unapproachable. Indeed, Scoresby effected more for geographical science in a few days than had been done in that direction for centuries. His voyage appears to have been the stimulus which roused the Danish Government to the exertion of sending out a very able naval officer, of perseverance, intelligence, and courage, not exceeded by the most enterprising officers of any country. Captain Graah sailed from Copenhagen the 31st of March, 1828, and returned in September 1831, but it was not till 1837 that we were able to read in English that excellent narrative with which most of us are so well acquainted.

The now well-known fact that the ruins of churches and other buildings have been found in the district of Julianashaab, on the south-west coast of Greenland, may lead some to suppose

that the question is thereby settled; but it should be remembered that there is nothing in the ruins themselves, apart from the testimony of ancient documents, to show that they may not have been those of the West Bygd, whereas the point at issue is the site of the East Bygd, far and away the more important of the two, and the seat of the bishopric. It is true that Captain Graah believed the East Bygd to have been situated in Julianashaab, and laboured to prove it; but I can conscientiously assert that, after a careful study of his book, I was still of opinion that the East Bygd was on the east coast; and that I was not the only one unconvinced by Captain Graah's arguments will be seen by the following quotation from a valuable work, entitled 'Iceland, Greenland, and the Faröe Islands,' published in 1844, by Harper, of New York:—

"The voyage of Graah, which has been regarded as settling the dispute, is by no means decisive. The difficulties he had to encounter prevented him from surveying the shores with the requisite accuracy, and the interior of the fiords, where the ruins of the colony might be expected to occur, were almost unvisited. Moreover, he himself acknowledges that before going out he was 'thoroughly convinced that the East Bygd would not be found on the east coast,' a state of mind not the best fitted to ensure success or encourage exertion. While these things lessen the value of his evidence against its existence on the eastern coast, some facts stated by him tend rather to favour the opposite conclusion."

And, after having well weighed Captain Graah's arguments, he says:—"For these reasons we are disposed to regard this point not only as still undecided, but one on which, without more evidence, it would be premature to come to any conclusion."

It will have been observed that I have not allowed myself to pause upon the details of any of those explorations, which occupied some three centuries, and with good reason. The point in dispute has been an object of inquiry not for the keel and the compass only, but also for the pen, and Danes and Icelanders have for centuries studied old Sagas and chorographies, in the hope of arriving by dint of comparison, analysis, and digestion at the solution of a mystery which seemed always to slip away from the grasp of certainty; and yet the whole of that time they had the best possible means of settling the question within their possession.

That same Ivar Bardsen, so many years steward or justiciary to the bishopric of Gardar in the East Bygd, was sent out by the bishop with succours to the West Bygd when the latter was

attacked by the Skrellings. Now this man has left us sailing directions for reaching the East Bygd, both from Bergen in Norway, and from Iceland, and he has also left us a chorography of Greenland itself; and as he was himself a Greenlander, and long a resident in the East Bygd, knowing perfectly all the places of which he speaks, I hold his testimony to be of the highest value and not to be lightly disputed.

There is in Purchas a copy of this document in English, the result of many translations, which belonged to Henry Hudson. It was translated from a German translation into Dutch by William Barentz. The Dutch belonged to Peter Plancius, who lent it to Hudson, and he had a fresh translation made into English expressly for himself. A more interesting group of names in connection with one document could scarcely be produced. Fortunately, the learned Danish Professor C. C. Rafn has given us in his extremely valuable 'Antiquitates Americanæ,' published in Copenhagen (1837, 4to), the text of an early copy of the document found in the Færöe Islands, with a Latin translation, by which I have been able to correct the defects of Hudson's mongrel copy.

Captain Graah, of whose gallantry as an explorer and ability as a writer I would never willingly speak without the deepest respect, is scarcely consistent when he speaks of this valuable document. He at one time says that 'the Chorography of Ivar Bardsen is the only one we can at all depend on in deciding the position of the Ostrebygd' (see p. 155); and when he mistakenly supposes that it does not sufficiently answer his purpose, he says (p. 175), that "His sailing directions are at best apocryphal; that they have been written down from oral tradition, and collected and put together by Archbishop Walkendorf a century after all intercourse with Greenland had ceased."

I am reluctantly obliged to say that this assertion is not compatible with common sense. How could oral traditions, collected by Archbishop Walkendorf in 1516, be made to be one and the same thing with a consecutive description of the topography of the country more ample in detail than any other that exists, derived from Ivar Bardsen, who flourished in the fourteenth century, and which, as will be presently shown, proves the East Bygd to be on the south-west coast, while Walkendorf and all those whom he consulted were convinced it was on the east coast?

Captain Graah has given us another very remarkable proof that his critical treatment of Ivar Bardsen cannot be blindly accepted. In his sailing directions Ivar Bardsen tells us that, "in sailing from Iceland to Greenland, you first shape your

course due west till you come to Gunnbiorn's Skerries, which lie midway between Iceland and Greenland, and in the ancient times this westerly course was followed to Greenland, but now the ice has drifted down from the north, and set itself fast so near to Gunnbiorn's Skerries, that none without peril of life can follow it. You then sail to the south-west until you have got past all the ice lying at and about Gunnbiorn's Skerries, and must then steer to the north-west for a day and a night, which will bring you to Hvarf."

On this downward drifting of the ice Captain Graah remarks (p. 158): "This can scarcely have been the real cause, for the ice along the east coast of Greenland was in all likelihood much the same in the tenth century as it was in the fourteenth and is now."

This, to me, unintelligible remark, reads oddly by the side of the following expression of the Danish hydrographer, Admiral Zahrtmann. "We learn," he says, "from Captain Graah,* that the ice is continually on the increase along this coast, thereby necessitating its thin population to emigrate to the west side, where this increase of ice and decay of the monuments of antiquity are also keeping pace together."

Having thus disposed of the ice round Gunnbiorn's Skerries, Captain Graah dealt with the Skerries themselves in the following manner. Not finding them where Ivar Bardsen places them, midway between Iceland and Greenland, he says that "the fact is disproved not only by the experience of the Icelandic traders and fishermen, but by that also of the English and Dutch whalers," and, *proprio motu*, he applied the name of Gunnbiorn's Skerries to some small rocks close off the coast of Greenland, in lat. 65° 30′, an artificial mode of making Ivar Bardsen's sailing directions lead to the site where Captain Graah assumed the East Bygd to lie. By such a route to Julianashaab, it is clear that Captain Graah cannot claim to be following the guidance and authority of Ivar Bardsen, but simply his own conclusions. These conclusions, though very natural, threw discredit on the value of Ivar Bardsen's guidance, and yet, as we shall see, Ivar Bardsen was a faithful guide who would have led him unerringly to the desired spot.

Gunnbiorn's rocks, to have auswered Ivar Bardsen's description, could have been of no insignificant size, and yet it is quite true that they were not to be seen where Ivar Bardsen places them. Captain Graah, therefore, was in no sense to blame for the conclusion that he came to, but at the same time

* 'Royal Geographical Society's Journal,' vol. v. p. 102.

Ivar Bardsen was not at fault either. It has been my good fortune to make the discovery of a fact with which neither Captain Graah nor any of the disputants in this case have been in the slightest degree acquainted, but which entirely vindicates the integrity of Ivar Bardsen's directions, and will, it is hoped, help to remove from the long-vexed question of the site of the East Bygd those remains of doubt which Captain Graah, with all his great merits, has still allowed to rest on the minds of many on this subject.

In the 1507 edition of Ptolemy is a most valuable map of the world, made by a German named Johann Ruysch, a map which would be eminently remarkable as an engraved map if only for its very early date, but it is pre-eminently so from the fact that it is the first engraved map on which America is laid down. Now, for more than a quarter of a century, I have been aware of the fact that on this map was a legend recording the destruction by a volcanic eruption, at an early date, of an island somewhere up in the north, and I recollect many years ago pointing out the fact to Sir John Richardson; but no special line of study had at that time led him or me to the recognition of what this island might be. When, however, the subject of which I am now treating began seriously to occupy my attention, the existence of this legend came back to my memory, and, on recurring to the old map, I found midway between Iceland and Greenland, as Ivar Bardsen had described the position of Gunnbiorn's Skerries, though rather nearer to Iceland than to Greenland, a large island, against which stood this inscription—"Insula hæc anno Domini 1456 fuit totaliter combusta." "This island in the year of our Lord 1456 was entirely blown up;" and, in confirmation of the fact, I found on later maps the shoal formed by the remains of the explosion laid down in precisely the same locality with the name of "Gombar Scheer," a name which it is impossible not to recognise as a sailor's version of Gunnbiorn's Skerries.

On one of these maps, entitled "Pascaert van Groenlandt," by Jan van Keulen, without a date, but about 1700, I had the pleasure to find soundings on the reef. The shoal was represented as *full sixty miles* long from north to south, and about 25 miles broad from east to west. The soundings at the north and south ends were both 25 fathoms, while the nearest soundings northwards were 70, 80, and 100 fathoms. It has been stated, that while this shoal lies essentially in the position described by Ivar Bardsen, midway between Iceland and Greenland, it is, if anything, somewhat nearer to Iceland, a fact which will, I conceive, from a nautical point of view, give additional weight to the correctness of Ivar Bardsen's direc-

tions; for the more easterly the point at which the sailor began to set his south-west course, the more likely would he be, under the influence of the strong south-west current, to make sufficient southing to bring his vessel into a position to make Cape Farewell by a subsequent tack to the north-west.

But now that Ivar Bardsen's sailing directions are restored to their integrity, let us see what his chorography says. Of course only such extracts are given as are necessary. He brings us by sea to a highland named Hvarf, a word which means a turning-point, and is the same word which, in the north of Scotland, has taken the shape of Cape Wrath.

From this point Ivar Bardsen takes us first eastwards, and by long leaps brings us to two fiords, quite uninhabited, named respectively Berefiord and Oellum-lengri, which means "the longest of all." It is so long that he says "no one ever saw the end of it." It may very easily be Franz Joseph Fiord, which Lieutenant Payer, in Captain Koldewey's expedition in the *Germania* in 1870, ascended for 70 miles, and then from the top of a peak, 7000 feet high, saw it still stretching indefinitely westward. "Further to the east," Ivar Bardsen says, "is a great mountain of ice named Finnsbuda, and further still an island named Kaarsoe, beyond which nothing can be seen on sea or land but ice and snow."

He then brings us back to his starting-point Hvarf, and thence leads us westwards, describing *seriatim* the different fiords and localities in the East Bygd, about whose names there is no manner of doubt, as several of them are mentioned in the Sagas and the other chorographies. And now what follows is deserving of special notice. After leading us from place to place gradually westwards to a fiord called Ericksfiord, he says: "*Northwards* from Ericksfiord are two arms of the sea, named Ydrevig and Indrevig. Next, *northwards*, lies Bredefiord; thence, *further to the north*, is Eyrarfiord; and so on to Isefiord, which is the most westerly fiord in the East Bygd."

He then says, that between the East and the West Bygd was a space of twelve nautical miles of entirely uninhabited country, and finishes his chorography by saying that the West Bygd had been utterly depopulated by the Skrellings.

Now it does not need much reflection to see that this series of places running westwards from Hvarf cannot possibly be on the east coast, for let us place Hvarf on that coast wherever we may—say, for argument's sake, where the old Icelanders conjectured that it lay, in about lat. 63°—every step we then take to the west, *i. e.* to our left hand, leads us more and more to the south, while Ivar Bardsen makes the last-named places in the series go more and more to the north. It is needless

to say that on the west coast the case is exactly reversed. If, therefore, we take Hvarf to be, as its name would suggest, the "turning-point" of the east and west coasts, the description is in harmony not only with common sense, but with the real trending of the land first west, then north, as later geographical research has shown it to be, and thus, beyond all question, we have the East Bygd in the district of Julianashaab, where Captain Graah, by more circuitous but less conclusive processes, strove to prove it to be.

This simple exposition is my strong point for the final settlement of the site of the East Bygd, and I believe it to be unanswerable. It may not unreasonably be regarded as a matter of surprise that an argument so conclusive as this should have escaped the attention of all the distinguished commentators who have sought the solution of this question, from Archbishop Walkendorf in 1516, and the learned Torfæus, downwards to the present day. A higher authority than Ivar Bardsen could not possibly be desired; a more explicit and lucid description could not be wished; the conclusion from it is utterly inevitable; and yet Captain Graah himself, whose whole heart and soul were in the subject, and whose very words are "that the chorography of Ivar Bardsen is the only one we can at all depend on in this matter," wrote a most able and learned appendix of twenty-one octavo pages in small type to prove his point by ingenious arguments on the application of almost every other ancient passage but the one which would have placed unanswerable demonstration between his fingers.

It may be suggested that in the sixteenth and seventeenth centuries they had no maps sufficiently trustworthy to help them to such a conclusion. There remains, however, another process of reasoning, equally simple, which leads to the same result without the need of a map. If the series of places *eastwards* from Hvarf brings us to where "one can go no further for the ice and snow," which are characteristics of the north, and if the series of names *westwards* terminates also with places more and yet more to the north, it stands to reason that Hvarf itself must be a point at the south between the two, and, consequently, the East Bygd, by Ivar Bardsen's showing, must of necessity have lain immediately to the west of the southern point of Greenland. Although neither of these lines of thought seems ever to have occurred to any commentator for the last 360 years, they are not the less conclusive for all that.

And now let us see how far Ivar Bardsen's and Zeno's descriptions are confirmative of each other.

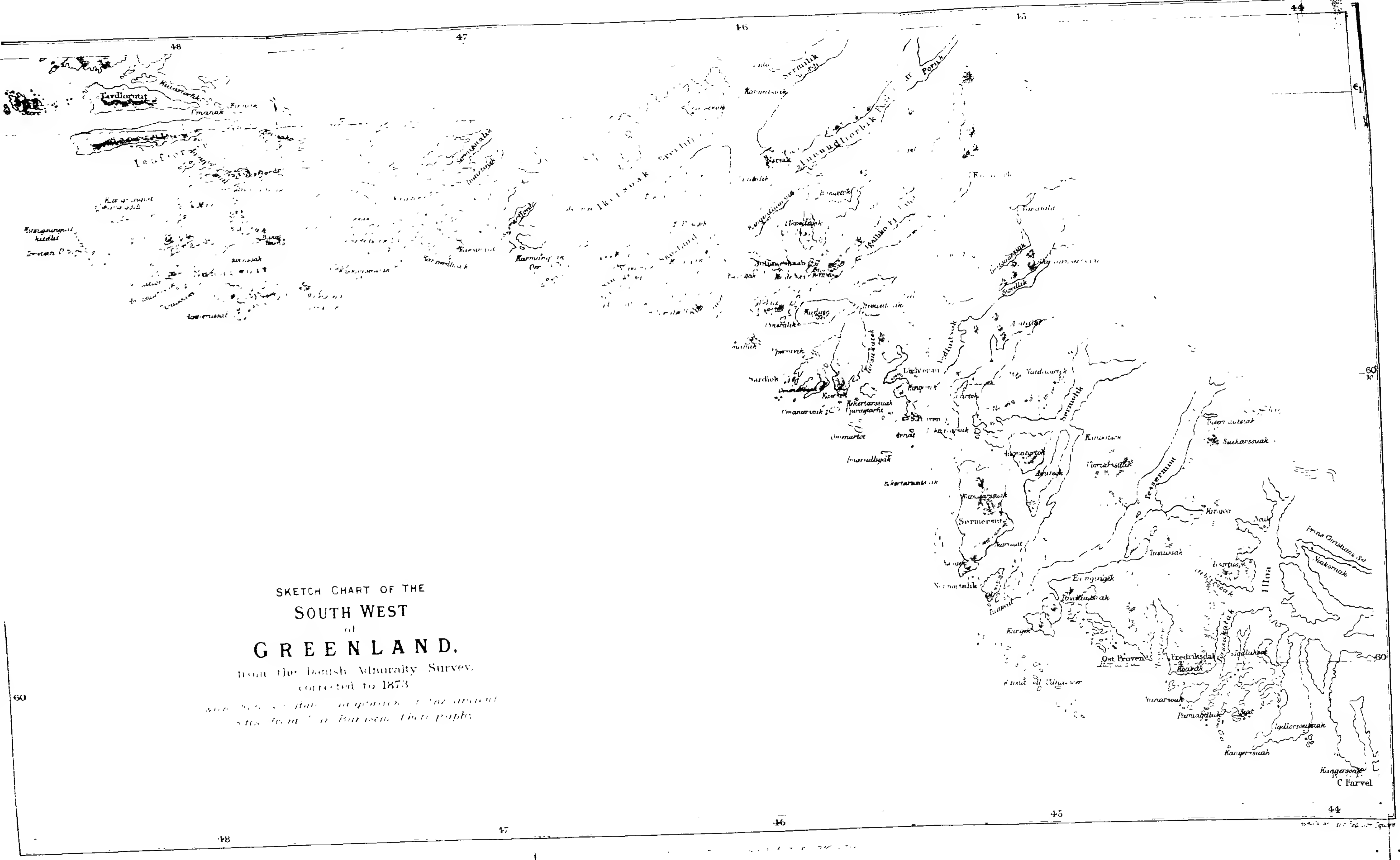
After enumerating a few places west of Hvarf, Ivar Bardsen brings us to a place called Petersvig, near which is a great

monastery dedicated to St. Olaus and St. Augustine. He also says that "in the inner recess of a neighbouring fiord, called Rafnsfiord, is a cloister of Sisters of the Order of St. Benedict. Within the bay are some small islands half belonging to the cloister and half to the cathedral. These islands abound in water, so hot in winter as to be unapproachable, but in summer temperate enough to be used for washing and for the healing of the sick."

We have a corroboration of this fact in the hot springs of Ounartok, near which some remains of the buildings of the old colonists have been found. Captain Graah, who visited these, tells us that there are three springs close by one another at the north-east corner of the island of Ounartok. The one nearest the sea is insignificant, its temperature being only 26° of Réaumur (91° Fahr.). The second, a few paces from it, forms a lake of about 48 feet in circuit; its temperature was 27° (93° Fahr.) The third is still larger, being about 70 feet in circuit, and its temperature from 32 to 33½° Réaumur (104 to 108° Fahr.) The Greenlanders state that the water is much hotter in winter than in summer: an effect which probably arises from the air being much colder in winter, and the contrast accordingly more perceptible. This must be acknowledged to be, incidentally at least, a very remarkable confirmation by the old Greenlanders of Zeno's interesting story of the monastery. That he makes no reference to the ingenious applications of the hot water need occasion no surprise, for they may not have existed at the time when he wrote, which was considerably before Zeno's period; and even if they did, they were items of detail which would not necessarily be inserted in a mere chorography. The difference between the names of St. Olaus and St. Tomaso, given by the two to the same monastery, is easily explainable. The Northern name of St. Olaf would be as strange as Sanscrit to the mind of the Venetian, and its Latinised form of St. Olaus would sound to his ear like nothing so much as San Tomaso. As regards his describing the monks as Dominicans instead of Augustinians, we have no alternative but to accept it as a misapprehension on his part, bearing no influence upon the question either one way or the other.

Professor Rafn, to whose learning and untiring industry we are so deeply indebted for the great amount of enlightenment that we now possess on the movements of the old Scandinavians in Greenland, has endeavoured to fix the localities of the ancient settlements on the face of a modern map, and, as far as may be judged from Ivar Bardsen's chorography taken by itself, the Professor's map appears most admirably and judiciously drawn up. A sketch map of the district from a Danish

Admiralty chart corrected to 1871, with Rafn's adaptation of the ancient names, is here given. At the time that I had the honour of reading this paper before the Royal Geographical


SKETCH CHART OF THE
SOUTH WEST
of
GREENLAND,
from the Danish Admiralty Survey,
corrected to 1873
Sardlok
Sermersut
Ost Proven
Fredriksdal
Ilua
C Farvel

Admiralty chart corrected to 1871, with Rafn's adaptation of the ancient names, is here given. At the time that I had the honour of reading this paper before the Royal Geographical Society, I was easily tempted to conclude that the hot springs referred to by Ivar Bardsen, which seemed to tally with those of Ounartok, visited and described by Captain Graah, were also identical with the sources of the hot water used in the monastery described by Zeno. Subsequent reflection has caused me to alter this opinion. The only monastery mentioned by Ivar Bardsen is the Augustinian one dedicated to St. Olaus, and as far as I am able to form an opinion from Ivar Bardsen's chorography alone, I see no reason to differ from the conclusion of Professor Rafn, who places its site near the lake which lies on the right-hand side of the inner recess of the Fjord of Tessermuit, in lat. 60° 26′, in almost the same latitude, it is true, as Ounartok, but separated therefrom by two fjords, at the mouth of the second of which Ounartok lies. Moreover, the description of the islands of Ounartok does not tally with that of the site of the monastery, which, according to Ivar Bardsen, was near a lake, a condition realised in the position adopted by Rafn.

It is true that Dr. Rink, the late Inspector of South Greenland, has obligingly written to inform me that he knows of no hot springs in the district of Julianashaab, besides those of Ounartok: but there is enough capriciousness in volcanic action to make that fact far from conclusive as to the non-existence of hot springs in another proximate locality five centuries ago. Moreover, there is a remarkable explicitness in the description of a phenomenon which our knowledge in the present day shows to be perfectly accurate. The text says that "where the warm water falls into the sea there is a large and wide harbour, which, from the heat of the boiling water, never freezes all the winter, and the consequence is that there is such an attraction for seafowl and fish, that they are caught in unlimited quantity."

In this description we have a picture of far greater volume and activity in the hot spring than is conveyed by Captain Graah's description of the shallow pools, nowhere deeper than a foot, at Ounartok. Yet this volume and this activity of the thermal spring are requisite for the effect described, viz., the attraction of the fish, so that we are compelled to assume the former existence of a spring near the monastery, now no longer known.

The mention of the employment of the pumice and calcareous tufa in constructing buildings, and making the mortar which bound them together, would also seem to imply greater abundance of material than could be looked for in the pools at Ounartok. In any case we cannot but regard the account of

the monastery as one of those "descriptions détaillées d'objets dont rien en l'Europe ne pouvoit leur avoir donné l'idée," for which Humboldt commends the Zeno narrative: while the existence of the Ounartok hot springs in the neighbourhood at the present day, and the mention of such hot springs by Ivar Bardsen about the same locality, are evidences quite sufficient to warrant our acceptance of the credibility of the Zeno account. But the monastery was not only near a lake according to Ivar Bardsen, but according to Zeno it was near a hill which vomited fire like Vesuvius and Etna, and whether it be an extinct volcano or not, there is on the Danish map, in a position corresponding with that fixed by Rafn, a hill named Suikärssuak. Closely connected with this subject is one to which I at page 170 promised to recur. It is to be noticed that both in the map and in the narrative there are two names, "Grolanda," or "Grolandia," and "Engronelanda," which the text shows to mean only one country. In one place, the word Grolanda is applied by Antonio Zeno to the country discovered by his brother Nicolò, whereas on a previous page that same country is called Engronelanda, and we have the clearest possible proof in the Zeno map, that that country is Greenland. From an extract from Antonio Zeno's letter, in the text, we gather that the remarkable delineation of Greenland on the map is derived from Sinclair, since the language takes the following shape: "I have written the life of my brother, the Chevalier, Messire Nicolò, with the discovery which he made, and all about Grolanda. I have also written the life and exploits of Zichmni, a prince as worthy of immortal memory as any that ever lived for his great bravery and remarkable goodness. In it I have described the *discovery of Engroniland on both sides and the city that he founded.*"

The combination of these two expressions in one sentence leads to the inference that the discovery of Greenland on both sides was due to Sinclair. On page 170 I wrote as follows:—"Those portions of the ancient story which have not been marred by misreading, exaggeration, or unintelligent interference, are, *with one exception*, which will be spoken of hereafter, in harmony with the knowledge which we possess in the present day."

We now come to speak of that exception. As has been just said, in the description of Nicolò Zeno's visit to Greenland it is stated (p. 12), that "he found a monastery *hard by a hill, which vomited fire like Vesuvius and Etna,*" and then the account goes on to speak of the spring of hot water with which the church of the monastery and the chambers of the friars were heated. Now although we know of thermal springs in Greenland, and

in the very district which has been demonstrated to be the site of the ancient colony, we have never heard of any active volcano there. Nevertheless, we have at the close of this very narrative a corroboration from an independent source of this statement respecting a volcano. When Sinclair reached Greenland, after an adventure off Ireland, to be detailed presently, he entered a harbour, from which, Antonio says, "we saw in the distance a great mountain that poured forth smoke." The harbour they called Trin, and whether rightly or wrongly, that is to say, whether so standing on the old map or inserted haphazard by Nicolò Zeno, junior, the promontory of Trin is placed at the extreme south point of Greenland. A hundred soldiers sent out from the harbour of Trin to explore the country, returned after eight days, and brought word that "they had been up to the mountain, and that the smoke was a natural thing proceeding from a great fire in the bottom of the hill, and that there was a spring from which issued a certain matter like pitch, which ran into the sea."

This twofold testimony to the existence at that time of a volcano in the south of Greenland, of which we know nothing at the present day, seems to place the subject out of the range of those puzzles which have originated from Nicolò Zeno junior's misreading or misapprehension. Although no one yet, as far as I am aware, has detected the existence in this locality of either an active or an extinct volcano, it must be conceded that in a country like Greenland the existence of an extinct volcano may very easily elude observation, both from the denudation of its peak by glacial action, and from the snow and ice concealing what lies below them. Meanwhile, the known existence of thermal springs in the neighbourhood favours the reasonableness of our accepting as accurate the two statements of the text.

So much for the confirmation of Zeno by Ivar Bardsen; we now come to the confirmation of Ivar Bardsen by Zeno. In spite of all the ridiculous blunders implanted on it by Nicolò Zeno, junior, from misreadings of the narrative, the Zeno map was based on a genuine old map made by his ancestor. As such it is a most remarkable phenomenon in geographical history, for it contains geography far in advance not only of what was generally known at the time when it was first laid down in the fourteenth century, but in advance even by generations of what was known at the time of its publication in the sixteenth century. The approximate accuracy in the delineation of Greenland under the name of Engroneland has been the subject of repeated notice. The reader's attention is invited to the word "Avorf" on that map near its south point.

It is a valuable word, for it proves a very great deal. There can be no doubt that it is the "Hvarf" of Ivar Bardsen and all the chorographies. In fact, in Bjorn Jonsen's chorography, where it is spelt "Hafhvarf," the identity is still more apparent. Near it also is the name of "Af Prom," which is doubtless a second mode of writing the same thing, viz., the promontory of Hvarf, by the maker of the old map. The position of this name on this map is a most remarkable evidence from a quarter where one would least expect it; viz., from the chance visit of a Venetian to the spot at the close of the fourteenth century, of the true site of the lost East Bygd. Its spelling is another example of the mode in which a Northern word can be represented by a Southerner, and its accordance with the native description of Ivar Bardsen is another proof of Nicolò Zeno junior's ignorant reading of the text when he places the convent of St. Thomas in the preposterous position in which we see it, on the remotest shores of the Frozen Ocean. Having first mistaken Bres, or rather Bressay, where his ancestor's brother wintered in the Shetland Islands, for a place in Iceland, and finding that in the spring he goes north to Engroneland, he places him up there.*

Another notable fact is that, in the Zeno map, all the settlements lie on the west and not on the east coast. While, therefore, these facts corroborate Ivar Bardsen's chorography and the site of the East Bygd derived therefrom, they also, in the most conclusive manner, prove the genuineness of the original narrative and map of the Zeno, and that the chief cause of the doubt of their authenticity has been Nicolò Zeno junior's blundering readings of the narrative represented upon the face of the map. This being so, we find ourselves in possession of an interesting description of the prosperous condition of the East Bygd, between the period of the destruction of the West Bygd and its own disappearance from man's knowledge, which we possess in no other document whatever. The description of the fishermen's boats and their contrivances for safety in those dangerous seas is truly admirable. The mode of constructing their houses in this strange country, related to us by an eyewitness, five hundred years ago, and the use of potstone, a true

* One of Admiral Zahrtmann's insinuations entirely unsupported by evidence, is that Nicolò Zeno may have derived from priests in Rome information about Greenland which they had received from Archbishop Walkendorf during his exile. It is not likely, for Walkendorf died in Amsterdam when Zeno was eight years old. His main object was to learn the way to the East Bygd, and Ivar Bardsen's directions and chorography stood first and most important among the documents that he secured. If, then, Nicolò Zeno by any process gained possession of Walkendorf's information, it was quite impossible that he should place the monastery of St. Thomas where he has done on the map.

Greenlandic product, in their domestic utensils, have about them an interest of a very rare character; and the plan of heating their dwellings and cooking their victuals with the water of the natural hot springs, is but a curious early example of what has been done in later times at Chaudes Aigues, in the department of Cantal, where the water from the Par fountain conveys heat to some hundreds of houses, and is made otherwise serviceable for domestic purposes.

After the death of Nicolò, Sinclair would not allow Antonio to return to Venice, but being determined to make himself lord of the sea, wished to send him out to the westwards to verify the report of some fishermen who had discovered some rich and populous countries in that direction, which we shall presently see to be America. The narrative, which was embodied in a letter from Antonio to his brother Carlo, is in brief as follows.

Six and twenty years ago four fishing-boats put out to sea, and encountering a heavy storm were driven over the sea in utter helplessness for many days, and at length came to an island called Estotilanda, lying 1000 miles west of Frislanda. One of the boats was wrecked and its crew of six men were brought by the natives into a large and populous city and taken before the chief, who sent for many interpreters to speak with them. Only one of these, who spoke Latin and had also been cast by chance upon the island, could understand them. On learning who they were and where they came from, the chief desired that they should stay in the country, which they did perforce for five years, and learned the language. One of them in particular, having seen much of the island, reported that it was rather smaller than Iceland, but much more fertile, having in the middle a high mountain, whence flow four rivers which water the whole country. The inhabitants are very intelligent, and possess many arts. In the King's library were found several Latin books, which were not at that time understood. The people had their own language and letters, and in the south there was a great and populous country very rich in gold. Their foreign intercourse was with Engroneland, whence they imported furs, brimstone, and pitch. They sowed corn and made beer, which is "a kind of drink that north people take as we do wine." They had woods of immense extent and many towns and villages. They built small boats and sailed them, but knew nothing of the compass. Hence these fishermen were held in high estimation, and were sent southwards with twelve boats to a country called Drogio. They arrived there after a perilous voyage, but the inhabitants being cannibals, most of the crews were eaten. The fisherman and his companions were spared because they could catch fish with nets, and they were so much prized

on this account that a neighbouring chief made war on their master to get possession of them, and being the stronger, succeeded. In this way they spent thirteen years, being fought for and won by more than twenty-five chiefs in that time, and in the course of his wanderings the fisherman gained much information. He describes the country as very large, and, as it were, a new world, the people very rude and uncultivated. They go naked and suffer from the cold, but have not the sense to clothe themselves with skins. They live by hunting, but as they have no metal, they use lances of wood, sharpened at the point and bound with strings of hide. They fight fiercely, and afterwards eat the conquered. They have chiefs and laws which differ in the several tribes. They grow more civilised towards the south-west, where the climate is milder, and they have cities and temples to their idols, in which they sacrifice men and afterwards eat them. In those parts they have knowledge of gold and silver.

At last the fisherman determined, if possible, to return to his country, and finally succeeded. He worked his way to Drogio, where he stayed three years, when some boats from Estotiland came to the coast and received him on board as interpreter. Finally, he returned to Frisland, and gave an account of this important country to Sinclair.

This appears to have been, for the close of the fourteenth century, a pretty good description of the state of things in America as far down as Mexico. It is evidently a *résumé* of the knowledge acquired by the Northmen in their expeditions to the west and south-west. In addition to the information gathered by the fisherman during his own long stay in the country, he would, on his return to Greenland or Iceland, hear much from those who kept up mercantile connection with America, to add to the store of knowledge which he communicated to Sinclair.

One of the first achievements of the Greenland colonists was the discovery of North America by Lief, son of Eric the Red, in the year 1001. The tracts of country there discovered were called Helluland, *i.e.*, Slate Land, supposed to be Newfoundland; Markland, *i.e*, Woodland, supposed to be Nova Scotia; and Vinland or Vineland. There is much uncertainty about the situation of the two former, but the site of Vinland is less problematical. One of the old writers says that on the shortest day in Vinland the sun was above the horizon from Dagmaal to Eikt, and as Dagmaal is known to have meant half-past seven o'clock A.M., and Eikt half-past four o'clock P.M., it follows that the length of the day was nine hours, which gives the latitude of 41°. This deduction is confirmed by a curious coincidence. Adam of Bremen, writing in the eleventh century, states on the

authority of Svein Estridson, King of Denmark, a nephew of Canute the Great, that Vinland got its name from the vine growing wild there, and for the same reason the English rediscoverers gave the name of Martha's Vineyard to the large island, close off the coast, in latitude 41° 23′.

The old documents also mention a country called Huitramannaland or Whiteman's Land, otherwise Irland it Mikla or Great Ireland, supposed to include North and South Carolina, Georgia and Florida. There is a tradition among the Shawanese Indians, who emigrated some years ago from Florida and settled in Ohio, that Florida was inhabited by white people who possessed iron instruments. It is further recorded in the ancient MSS., that the Greenland Bishop Erick went over to Vinland in the year 1121, and that in 1266 a voyage of discovery to the arctic regions of America was made under the auspices of some clergymen of the Greenland Bishopric. The next recorded discovery was made by Adalbrand and Thorwald Helgason, two Icelandic clergymen, in the year 1285, the country found being supposed to be Newfoundland. The last record preserved in the old Icelandic MSS. relates a voyage from Greenland to Markland, performed by a crew of seventeen men in the year 1347. The account written by a contemporary nine years after the event speaks of Markland as a country still known and visited in those days, and it was, until now, the latest document that spoke of the maintenance of intercourse between Greenland and America. In the Zeno document, however, we have the very latest evidence known in literature of the continued existence of that intercourse down to the close of the fourteenth century, a hundred years before the time of Columbus; for although the valuable Codex Flateiensis, preserved in Copenhagen, was completed at a period exactly contemporary with that of the Zeni, it does not record such late details on this interesting subject. The descriptions of the old Icelandic MSS. sufficiently explain how Latin books, which had been taken over by the priests, should be found in the chief's possession. The woods of immense extent tell their own story. The importance of catching the codfish with nets, the description of the natives and their habits, the report of a country to the south rich in gold, are points in the Zeno narrative in harmony with our present knowledge and the testimony of the Icelandic records. Perhaps the most interesting, as showing the existence of Scandinavian people and customs in America at that period, is the statement of their making beer, which, as Zeno says, is "a kind of drink that Northern people take as we do wine." Of the antiquity of beer-drinking in the North, we have proof from Sœmund the Learned, who in the eleventh century made that collection of

poems known as "the Poetic Edda." In the "Lay of the Dwarf Alvis" occurs the expression, "Ale it is called by men, but by the Æsir (gods) biorr." In the Copenhagen Museum are horns used of old by the Vikings for drinking beer. We have already had remarkable evidence that an inflated bombastic style may be used in the narration of a true story. When therefore in the description of a more remote country like America, we meet with such expressions as "the king's library," and "cities and temples," which might awaken misgivings as to the soundness of the story, we may revert to Zeno's account of the conquest of the Færöe Islands, and, recognising the same inflated style as common to the stories, acknowledge that it would be unreasonable on that score to throw more doubt upon the one than upon the other.

It will be observed that in the Zeno narrative "Estotiland" is described as an *island* and "Drogio" as a *country*. The former was somewhat less than "Islanda," and as the description of it very fairly agrees with Newfoundland, I have here rendered the word Islanda "Iceland" and not "Shetland" as it is translated in those other parts of the narrative, where the latter was obviously meant. That I am justified in this selection of the larger of the two localities bearing the name of "Islanda" to meet the comparison with Newfoundland as to size, will be seen by an expression near the end of the text, where it is shown that the book prepared by Antonio Zeno, but torn up by Nicolò Zeno, junior, contained descriptions of *both* Iceland and Shetland, although the former is left unnoticed in the text as we now have it, which was put together from the surviving letters of the ancient voyagers. Drogio, subject to such sophistications as the word may have undergone in its perilous transmission from the tongues of Indians *viâ* the Northern fisherman's repetition, to the ear of the Venetian, and its subsequent transfer to paper, appears to have been a native name for an extensive tract of North America.

At length the expedition is organised for the verification of the fisherman's statements, and as the story of its adventures is that part of the narrative which has caused the greatest perplexity, it is here given in full:—

"Our great preparations for the voyage to Estotiland were begun in an unlucky hour, for, three days before our departure, the fisherman died who was to have been our guide; nevertheless Zichmni would not give up the enterprise, but, in lieu of the fisherman, took some sailors that had come out with him from the island. Steering westwards, we discovered some islands subject to Frislanda, and passing certain shoals, came to Ledovo, where we stayed seven days to refresh ourselves and to furnish

the fleet with necessaries. Departing thence we arrived, on the 1st of July, at the Island of Ilofe; and as the wind was full in our favour we pushed on; but not long after, when we were on the open sea, there arose so great a storm that for eight days we were continuously kept in toil, and driven we knew not where, and a considerable number of the boats were lost. At length, when the storm abated, we gathered together the scattered boats, and sailing with a prosperous wind we discovered land on the west. Steering straight for it, we reached a quiet and safe harbour, in which we saw an infinite number of armed people, who came running furiously down to the water side, prepared to defend the island. Zichmni now caused his men to make signs of peace to them, and they sent ten men to us who could speak ten languages, but we could understand none of them, except one that was from Shetland. He, being brought before our prince, and asked what was the name of the island, and what people inhabited it, and who was the governor, answered that the island was called Icaria, and that all the kings that reigned there were called Icari, after the first king, who as they said, was the son of Dædalus, King of Scotland, who conquered that island, left his son there for king, and gave them those laws that they retain to the present time; that after this, when going to sail further, he was drowned in a great tempest; and in memory of his death that sea was called to this day the Icarian Sea, and the kings of the island were called Icari; that they were contented with the state which God had given them, and would neither alter their laws nor admit any stranger. They therefore requested our prince not to attempt to interfere with their laws, which they had received from that king of worthy memory, and observed up to the present time: that the attempt would lead to his own destruction, for they were all prepared to die rather than relax in any way the use of those laws. Nevertheless, that we might not think that they altogether refused intercourse with other men, they ended by saying that they would willingly receive one of our people, and give him an honourable position amongst them, if only for the sake of learning my language and gaining information as to our customs, in the same way as they had already received those other ten persons from ten different countries, who had come into their island. To all this our prince made no reply, beyond inquiring where there was a good harbour, and making signs that he intended to depart. Accordingly, sailing round about the island, he put in with all his fleet in full sail, into a harbour which he found on the eastern side. The sailors went on shore to take in wood and water, which they did as quickly as they could, for fear they might be attacked by the islanders; and

not without reason, for the inhabitants made signals to their neighbours with fire and smoke, and taking to their arms, the others coming to their aid, they all came running down to the seaside upon our men, with bows and arrows, so that many were slain and several wounded. Although we made signs of peace to them, it was of no use, for their rage increased more and more, as though they were fighting for their own very existence. Being thus compelled to depart, we sailed along in a great circuit about the island, being always followed on the hill-tops and along the sea-coasts by an infinite number of armed men. At length, doubling the northern cape of the island, we came upon many shoals, amongst which we were for ten days in continual danger of losing our whole fleet; but fortunately all that while the weather was very fine. All the way till we came to the east cape, we saw the inhabitants still on the hill-tops and by the sea-coast, keeping with us, howling and shouting at us from a distance to show their animosity towards us. We therefore resolved to put into some safe harbour, and see if we might once again speak with the Shetlander, but we failed in our object; for the people, more like beasts than men, stood constantly prepared to beat us back if we should attempt to come on land. Wherefore Zichmni, seeing that he could do nothing, and that if he were to persevere in his attempt, the fleet would fall short of provisions, took his departure with a fair wind and sailed six days to the westwards; but the wind afterwards shifting to the south-west, and the sea becoming rough, we sailed four days with the wind aft, and at length discovered land."

Icaria has been supposed by many commentators to represent some part of America. Johann Reinhold Forster was the first to suggest that it meant Kerry, and I am convinced that he was right, although for reasons that Forster has not adduced. The name, the point of arrival, the conduct of the natives, and the movements of the fleet after leaving the island, all lead to this conclusion. The expression in the original "scoprimmo da Ponente terra" is susceptible of two meanings, either that they came upon an island "to the westward" or "upon its western side." But as, when repulsed by the natives, they sailed round about the island, and came into a harbour on its eastern side, it is manifest that the harbour which they first entered was on the west, and in a position with which that of Kerry exactly corresponds.

The signals by fire and smoke, the pursuit along the hill-tops, and the howling of the strangers off the coast, are Irish all over. The sailing of the fleet six days to the westward with a fair wind after leaving the north point of the island without seeing

land, is a fact which accords with the situation of Ireland, but not with any part of America or any other country otherwise answering the conditions.

Admiral Zahrtmann says: "As to the fabulous parts of the narrative, it is difficult to select one passage in preference to another for refutation, the whole being a tissue of fiction."

Now it happens that there is no room for selection in the matter, for there is only one piece of fable in the whole story, and one cannot form a tissue out of a single thread. That one piece of fable (it must be understood that mere exaggerations of real events are not fables) is the story of the Kings of Icaria being called Icari after the first king, who was the son of Dædalus, King of Scotland, in memory of whose death by drowning that sea was called to this day the Icarian Sea. I am strongly of opinion that this excrescence on the narrative is the handywork of Nicolò Zeno, junior, and for the following reason. The form of the name Icaria was a very reasonable one for a Southerner to give to the Northern name of Kerry, but the Northerners from whom Zeno received it, would be little likely to tell him such a story as that which we here have of Dædalus and the Icarian Sea, which manifestly takes its origin from the form which the word had taken under the Southerner's pen. On these grounds I suggest the reasonableness of the conclusion that Nicolò Zeno, junior, found in his ancestor's letter the name Icaria only, without the fable. But as, during the very time that intervened between his discovery of the letters when he was a boy and his publication of them, his fellow-citizen, Bordone, brought out two editions of his "Isolario," in which that well-known fable is told of the island of Nicaria (*olim* Icaria) in the Ægean Sea, it seems highly probable that this suggested to his mind the grafting of the story on the name which he had found transmitted by his ancestor under the same form.

After the fleet had sailed six days to the westward from Ireland, the wind shifted to the south-west and carried them to a harbour in Greenland. To this harbour and the headland near it they gave the name of Trin, and here Sinclair, being taken with the pureness of the atmosphere and the aspect of the country, conceived the idea of making a settlement, or, as Zeno calls it, "founding a city." As, however, his people were anxious to get home, he merely retained the row-boats and such of the men as were inclined to stay with him, and sent all the rest away under the command of Antonio. After twenty days' sail to the eastward and five to the south-east, Zeno found himself on Neome—a locality which I need not trouble myself to speculate upon—and in three days reached Frisland or Thorshavn, and so ends the story.

Now the question may be asked: *Cui bono* all this toil of analysis and research devoted to a document so unimportant in size and of such limited contents? The facts may answer for themselves.

1. If the realities which have been here laid bare had been detected any time during the last three centuries and a quarter, so that the site of the lost East Colony of Greenland had been proved to demonstration instead of being a matter of opinion,* the Kings of Denmark would have been spared the necessity of sending out a great number of unsuccessful expeditions: and

2. A number of learned disquisitions by some of the most illustrious *literati* in Europe would have been rendered superfluous.

3. The Zeno document is now shown to be the *latest* in existence, as far as we know, giving details respecting the important lost East Colony of Greenland, which has been so anxiously sought for.

4. It is the *latest* document in existence, as far as we know, giving details respecting the European settlers in North America—although a century before Columbus's great voyage across the Atlantic—and showing that they still survived at that period.

5. The honour of a distinguished man, whose only faults as regards this ancient story, fruitful in mischief as they have been, were that he did not possess the geographical knowledge of to-day, and that he indulged in the glowing fancies and diction of his sunny country, has been vindicated: and

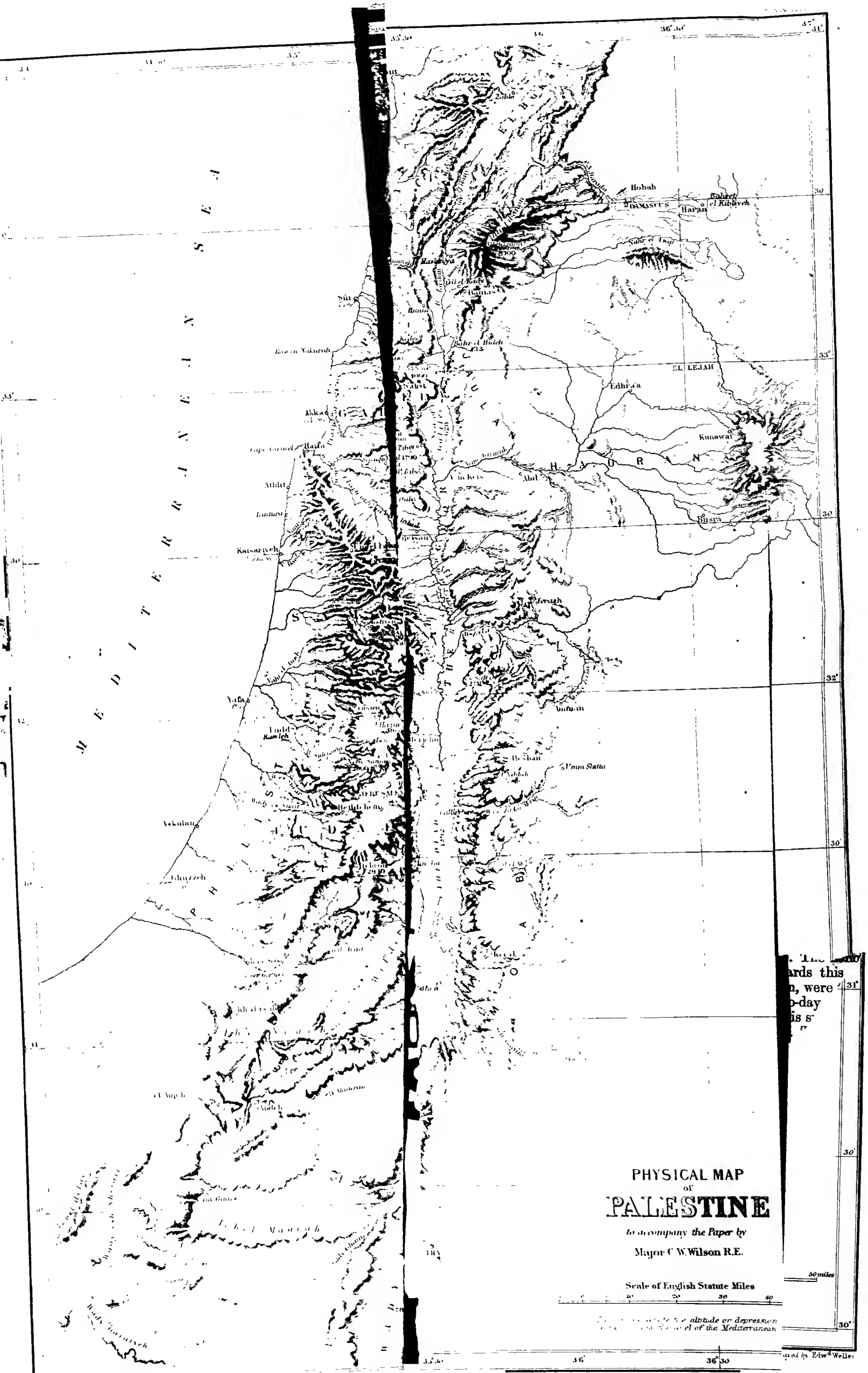
6. The book which has been declared to be "one of the most puzzling in the whole circle of literature" will henceforth be no puzzle at all.

IX.—*Recent Surveys in Sinai and Palestine.* By Major C. W. WILSON, R.E.

[*Read*, June 23rd, 1873.]

THERE are few countries in the world which, within the same area, present so many features of general interest as Sinai and

* There can be no better proof of the correctness of this statement than the fact that while the true site was correctly believed in by Eggers in 1794, Captain Graah was sent out in 1828 to learn, if possible, whether the site were on the east or the west coast; and even though he himself correctly believed in the true site, his pleas, on behalf of his convictions, were so inconclusive, that the learned author of 'Iceland, Greenland, and the Faröe Islands,' in 1840, after well weighing the arguments, says: "For these reasons we are disposed to regard this point not only as still undecided, but one on which without more evidence it would be premature to come to any conclusion."


PHYSICAL MAP
of
PALESTINE
to accompany the Paper by
Major C. W. Wilson R.E.
Scale of English Statute Miles
MEDITERRANEAN SEA
DAMASCUS
Hobah
Baalbek
el Kibliyeh
Haran
Sahr el Tuqi
Hasbeiya
Rashaiya
Banias
Sidon
Tyre
Akka
Haifa
Athlit
Kaisariyeh
Jaffa
Lydda
Ashdod
Ashkelon
Gaza
Khan Yunis
Rafah
Hebron
Jerusalem
Jericho
Bethlehem
Nablus
Jenin
Tiberias
Safed
Acre
Beisan
Jordan
Dead Sea
Sea of Galilee
Edhra'a
Kunawat
Busra
Umm Sattu
Ramleh
Ashdod
Gulf of Akaba
50 miles
altitude or depression
el of the Mediterranean

Palestine, yet it is only within the last few years that any attempt has been made to submit them to that thorough and systematic examination which is alike demanded by the geographer, the geologist, the archæologist, and the Biblical student. This work has been undertaken by the Palestine Exploration Fund, and other kindred societies, and the following paper has been prepared with a view of drawing attention to what may be called the geographical results of their labours, and more especially to the progress of the Trigonometrical Survey which was commenced in 1871.

The field of operations may be said to extend from Mount Hermon, in lat. 33° 26′ 10″ N., on the north, to Rás Muhammed in lat. 27° 43′ 20″ N., on the south, and from the Mediterranean on the west, to the longitude of Damascus, 36° 18′ 24″ E., on the east—an area of 40,000 square miles.

For the present, however, various considerations, principally those arising from want of funds, have induced the societies to confine their attention to Palestine proper, which includes an area of about 12,000 square miles.

At Rás Muhammed the great fissure of the Red Sea branches off to the right and left, one arm forming the Gulf of Suez, the other, under the several names of the Gulf of 'Akabah, the 'Arabah, the Ghor, and the Bukăa, stretching northwards to the vicinity of Antioch. At the southern extremity of the peninsula of Sinai rise the Sinaitic Mountains, a vast crystalline mass, similar in character to the adjoining mountains of Africa and Arabia; on the east they descend abruptly to the Gulf of 'Akabah, whilst on the west they are flanked by an arid plain, which extends almost without interruption to the Mediterranean, and, for some distance north of Tur, is separated from the Gulf of Suez by a low range of hills of tertiary sandstone. Northward, a broken sandstone district, sometimes known as the Debbet er Ramleh, separates the Sinaitic Mountains from the limestone plateau of the Tih, a dreary desert, that falls gradually towards the north, and is chiefly drained by the great Wády el Arish, the River of Egypt of the Bible.

To the plateau of the Tih succeed, on the north-east, the limestone hills of Judæa, rising near Hebron to a height of 2840 feet. This mountain range, which has been aptly called the "backbone" of Palestine, runs north to Esdraelon, with slightly varying altitude, and then, after throwing out a spur westward to Carmel, is linked to the Lebanon by the Hills of Galilee, which attain their culminating point in Jebel Jermuk, 4000 feet high. West of this central range extend with varying breadth the maritime plains of Philistia and Phœnicia,

whilst on the east lies the depression of the Jordan, forming a natural separation between Palestine and the great eastern plateau, which stretches away almost to the Euphrates.

The peninsula of Sinai has been well described as a "desert of rock, gravel, and boulder, of gaunt peaks, dreary ridges, and arid valleys;"* it is extremely wild and rugged, and is intersected by one of the most complicated systems of drainage in the world. The great crystalline mass which forms, as it were, the "core" of the peninsula, is split up into innumerable peaks, that attain a considerable altitude—Jebel Zebir, 8551 feet; J. Katerin, 8536 feet; J. Umm Shomer, 8449 feet; J. Músá, 7375 feet; and J. Serbál, 6734 feet—and present views of the most grand and impressive character. The sandstone district, rich in antiquities and mineral wealth, is broken up into quaint forms, which, combined with the rich covering, give a peculiar charm to the scenery; in the cretaceous and tertiary districts, on the other hand, the features are devoid of interest, and the scenery is monotonous, except when lighted up by the rich glow of the rising or setting sun. The wádies, or valleys, are deeply cut, and descend rapidly to the sea; they frequently take their rise in open plains, or "fershs," that lie at the foot of the peaks, and form one of the most interesting topographical features of the interior. The valleys appear to have been formed by the action of water, and in many places along their sides are lofty banks of alluvium, which, according to some writers, mark the existence, at a remote period, of inland lakes. The water supply is more abundant than has generally been supposed, and in the mountain districts, especially in the vicinity of Jebel Músá, there are several small perennial streams, and numerous springs of good water. The sandstone and limestone districts are badly supplied, and the water found in the latter is brackish and has a purgative effect.† There is one hot spring at the foot of Jebel Hammám Far'ún; the temperature is 157°.

The vegetation is sparse, but there are not wanting indications that it was formerly more plentiful; even now there is, at certain seasons of the year, a considerable amount of vegetation on the upland plains, and in addition to the well-known oasis of Feirán there are several others scattered over the peninsula. The climate is very variable; in the higher districts the cold in winter is severe, and the peaks are frequently covered with snow; in the lower districts the heat is intense, and, when the

* Capt. Palmer, in 'Ordnance Survey of Sinai,' vol. i. p. 17.

† This arises from the large quantities of carbonate of soda and other salts held in solution.

khamsin blows, almost unbearable. The air is dry, clear, and bracing, and there is always a great difference between the night and day temperature; the average rainfall is small, but the country is subject to local storms of great violence, which produce the "seils," or floods, so much dreaded by the Bedawín. One of these has been graphically described by an eye-witness, Mr. Holland;* it will suffice to mention here that on this occasion the bed of the great Wády Feirán was at one place washed out to a depth of 8 feet; and that in the gorge of Wády Sigillíyeh the water rose to a height of 30 feet, and then, after running nearly 20 miles over the dry desert of El Ga'ah, entered the sea near Tur a broad river from 3 to 4 feet deep.

One of the most striking features of Palestine proper is its natural division into four parallel strips—the Coast Plain, the Hill Country, the Jordan Valley, and the Eastern Plateau. The Coast Plain, from 10 to 20 miles wide, extends without a break from the desert on the south to Mount Carmel on the north; beyond Carmel lies the Plain of Acre, about 20 miles long and 4 to 6 wide, and this again is separated from the narrow Plain of Phœnicia by Rás en Nakúrah, better known as the Ladder of Tyre. The greater portion of the plain is fertile and cultivated, but north of the Nahr Aujeh there are low hills of tertiary sandstone, which check the drainage from the mountains, and give rise to several large swamps; these were formerly drained by tunnels or drifts cut through the hills, which are now choked with rubbish. The Hill Country commences about 50 miles south of the Mediterranean, and, interrupted only by the Plain of Esdraelon, traverses the country from south to north. The hills are broad-backed, and there is no marked grandeur in their physical features, but every here and there rounded summits rise above the general level of the range, and afford striking panoramas of the surrounding country. The average altitude may be gathered from the following heights:—Hebron, 2840 feet; Mount of Olives, 2665 feet; Neby Samwil, 2900 feet; Jebel Hazur, 3165 feet; Mount Ebal, 3029 feet; Jebel Fukua, 1716 feet; Neby Ismail (Nazareth), 1790 feet; Jebel Jermuk, 4000 feet.

The main road from Jerusalem to Nablus, Nazareth, and Banias follows the line of water-parting, and in close proximity to it were the most important cities of Judah and Israel. On the east the hills descend rapidly to the Jordan, and are furrowed and cleft by deep, wild torrent beds; whilst on the west they fall, at first abruptly, and then pass, by a series of low, undulating hills, the "Shephelah," or "low country" of

* 'Royal Geographical Society's Journal,' vol. xxxviii. p. 148.

Scripture, to the Maritime Plain. The valleys for the most part take their rise in small upland plains, and, preserving generally an east and west direction, debouch, after an infinite variety of windings, on the Coast Plain and the Jordan Valley.

The Jordan Valley runs nearly parallel to the coast from the base of Mount Hermon to the Dead Sea, which occupies its deepest portion. South of the Dead Sea the valley rises gradually for about 68 miles to the water-parting which, at an altitude of 781·4 feet, separates the waters of the Dead Sea from those of the Gulf of 'Akabah. This water-parting, which links the Tih to Arabia, is, according to M. Lartet, a cretaceous barrier separating in the most complete manner the two slopes of the district. The cretaceous strata are covered with their own débris, and show no trace of any water-course in the direction of the Red Sea.

The Eastern Plateau attains its greatest altitude at Es Salt, 2771 feet; it is tolerably uniform in its characteristics, and maintains, as far north as Banias, a general altitude of about 2000 feet. At this point the grand peak of Hermon rises to a height of 8700 feet, and forms the commencement of the range of Anti Lebanon. On the north the great plateau is covered by the basalts of the Jaulan, and east of them lie the volcanic hills of the Hauran and Ledja.

The one great river of the country is the Jordan, a river which, as Ritter justly observes, is wholly unique: "There is no other like it on the whole face of the earth; a purely inland river, having no embouchure on the sea, and closing its course at the very deepest part of the Old World, and far below the level of the ocean." After the junction of the three streams, which rise respectively at Hasbeiya, Tell el Kady, and Banias, the Jordan spreads out into the lake El Huleh, and thence descends rapidly to the Sea of Galilee; from this lake it follows for 66 miles a tortuous course, wholly below the level of the Mediterranean, to the Dead Sea. From Tell el Kady to El Huleh there is a fall of 328 feet in 11·9 miles, from El Huleh to the Sea of Galilee a fall of 898·75 in 11·1 miles, and from the Sea of Galilee to the Dead Sea a fall of 665·75 feet in 65·9 miles. From the Dead Sea to the water-parting there is a rise of 2073 feet in 67·9 miles, and from the water-parting to the Gulf of 'Akabah there is a fall of 781 feet in 40·7 miles. The Jordan has several tributaries, of which the most important are the Yarmuk and Zerka on the east, and the streams in Wadies Jalud and Fería on the west; in addition to these, Wadies Rubadiyeh and Hammám discharge their waters into the Sea of Galilee, and Wadies Zerka Main, Mojib, Kerak, and Ahsi into the Dead Sea. There are also several

streams running westward to the coast, as the Litany (Leontes), Naman (Belus), and the Kishon, north of Carmel; and the Belka, Zerka, Akhdar, and Aujeh, to the south. There are numerous springs of good fresh water, and several hot springs, of which the principal are those near Tiberias (132·2° to 142·2°), those near Umm Keis (Gadara), 110°; and those at Callirrhoe, in W. Zerka Main, 120°.

Palestine was evidently at one time thickly covered with forests, but they have entirely disappeared, except in a few places on the mountains and along the sea coast, and the only existing traces are the roots, that form one of the principal sources from which charcoal and firewood are obtained. The plains and rocky hills are, in spring, carpeted with herbaceous plants, but they soon disappear under the burning sun of summer, and the country then assumes a dreary, monotonous aspect. Though most of the country lies waste at present, it was at one time highly cultivated, and the art of "terrace culture" seems to have been brought to a state of great perfection. On every hill, remains of the ancient terraces can be traced rising one above the other, and even far to the south of Beersheba, Professor Palmer found long swathes of stones on the hill-side, marking the presence of former vineyards.

From the peculiar formation of the country, there is a great variety of climate; that of the Lebanon may be compared with that of the Alps; that of the Hill Country with Italy, and that of the Jordan Valley with the tropics. In summer, from local causes, the towns and villages are subject to fever, but the climate is generally healthy, and the bracing air of the Lebanon is always within easy reach. The most unhealthy periods of the year are May and October, when the country is visited by the khamsin winds, which frequently last for several days at a time. In connection with this wind, Dr. Chaplin has noticed the fact that it is entirely destitute of ozone. The rainy season commences at the end of October or beginning of November, and lasts till March; it is not a continuous rain, but a succession of heavy showers, with intervening periods of fine weather. The average rainfall at Jerusalem during the seven years from 1860 to 1867 was 19·62 inches, the maximum being 22·9 inches in 1860–61, and the minimum 14·8 in 1864–5. There are occasional falls of snow, and one at Jerusalem in April 1870 was 2 inches to 5 inches deep, and lay on the ground for three days. The country is still subject to those sudden storms which are so frequently alluded to in the Bible, and they are accompanied by a sudden fall in the temperature; on one occasion the temperature fell in a few minutes from about 75° to below freezing-point. In summer the dews are very

heavy, penetrating the tent, and wetting everything within it. There does not appear to have been any great change in the temperature, to that, at the date of the kingdoms of Judah and Israel; there may have been a slight decrease in the rainfall, but the existence of the conduits, pools, and cisterns for the water supply of Jerusalem, and the numerous aqueducts and cisterns for irrigation, show that there must always have been a deficiency of water, and the fact that the fruits grown at the present day, are those mentioned in the Bible would seem to confirm it.

Such are the principal features of the country in which the operations of the British and American societies are being carried on. Before, however, alluding to their labours, it will be well to give a brief account of the results obtained by previous travellers.

The publication, in 1835, of Berghaus's map ("Karte von Syrien"), with an accompanying memoir of great value, may be said to mark the commencement of a new era in the geographical investigation of Palestine, for it was the first serious attempt to classify and portray in a careful and systematic manner the results obtained by the earlier travellers of the present century.*

The winter of 1836–7 is marked by Von Schubert's travels, and his account of them contains much that is new, relating to the natural history of the country, as well as some vivid descriptions of the scenery.

In 1838 Russegger travelled through the country, and collected a mass of information, especially with regard to the geological character of the districts he passed through.

In 1838 also, Robinson and Eli Smith made their first journey through Sinai and Palestine, and the former published the result of their labours in a work, 'Biblical Researches in Palestine,' which still forms the text-book of all students of Scripture geography. Robinson was the first traveller who conceived the idea of writing such a book from personal observation on the ground itself. He prepared himself for his work by a course of arduous study, extending over a period of fifteen years, and reaped his reward in a series of important discoveries, which at once placed him in the foremost rank of travellers in the Holy Land. Provided only with a large compass, his numerous and careful bearings, and his strikingly accurate measurements and topographical descriptions, afforded such voluminous data that Professor Kiepert, of Berlin, was enabled to construct

* Clarke, Ali Bey, Seetzen, Burckhardt, Richter, Irby and Mangles, Legh, Richardson, Buckingham, Hogg, Catherwood, Marmont, Laborde, Rüppell, Wellsted, Moresby, &c.

a new map, which almost entirely superseded that of Berghaus.* Commencing at Sinai, Dr. Robinson travelled northwards to Damascus, collecting information at every step, and keeping a minute itinerary of his route, whilst his companion, Dr. Eli Smith, supplied lists of Arabic names, which have been of the greatest service to Biblical students.

In 1852 Dr. Robinson paid a second visit to Palestine, and was again accompanied by Dr. Eli Smith. Landing at Beyrout, they passed through Galilee to Acre, and thence through Galilee and Samaria to Jerusalem; from Jerusalem they turned northwards to Beisan, the Sea of Galilee, Hasbeiya, and Damascus, whence they crossed the Lebanon to Beyrout. Their route on this occasion passed through those districts which had not been previously examined, and an account of their journey was published in the 'Later Biblical Researches in Palestine,' which contained a new map by Prof. Kiepert.

In 1841 Lieut. Symonds, R.E., was enabled to make a triangulation of the country between Jaffa and Jerusalem, and thence to the head of the Dead Sea, on the south; and from Cape Blanco to Safed and the Sea of Galilee on the north; these two main series of triangles being connected by intermediate triangles. By this triangulation the level of the Dead Sea was fixed at 1312·2 feet, and that of the Sea of Galilee at 328·9 feet below the Mediterranean. The triangulation was made with an 8-inch theodolite from bases measured near Acre and Jaffa, but there were no astronomical observations. Some portion of the details of the northern sheet was filled in, but the whole was in too fragmentary a state for publication. For this service Lieut. Symonds received the Patrons' Gold Medal of the Royal Geographical Society in 1842.

From sketches made in 1840–41 by Scott, Robe, Wilbraham and Symonds, Major Scott prepared a map in three sheets; in this, however, Symonds' triangulation underwent much modification, instead of being used, as it should have been, as the basis for the construction of the map.

In 1846 Lepsius visited the peninsula of Sinai, and in addition to his archæological researches, collected much valuable information on the topography of Jebels Músá and Serbál.

In 1847 Lieut. Molyneux, R.N., made an adventurous descent from the Sea of Galilee to the Dead Sea, which unfortunately terminated in his premature death from exposure to the fierce rays of an autumnal sun.

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* Prof. Kiepert's map was accompanied by an excellent memoir, which is published in vol. iii. of the 'Biblical Researches.'

In 1848 Lynch descended the Jordan from the Sea of Galilee to the Dead Sea in two boats, and spent fifteen days on the latter lake. The results of his expedition were, a sketch of the course of the Jordan, which, considering the manner in which it was executed, is of great accuracy, and has never been superseded;* a very exact chart of the Dead Sea, with soundings, and the determination of its depression, by a line of levels carried up Wády en Nar to Jerusalem, and thence by the ordinary road to Jaffa. The sketch of the Jordan showed that in a direct distance of 60 miles, the length of the river was 200 miles, whilst the soundings gave the Dead Sea a maximum depth of 1308 feet, and the levels fixed its surface at 1317 feet below the Mediterranean. The instrument used in levelling was one of Troughton and Sims' spirit levels.

In 1850–51 M. de Saulcy visited the western and southern shores of the Dead Sea, Kerak, and Moab, and travelled northward through Palestine, collecting material which was embodied in a map published to illustrate his travels.

In a second journey, made in 1863–4, M. de Saulcy was accompanied by Capt. Gélis of the État Major, and the route sketches made by this officer from Jaffa to Jerusalem and Hebron, and from Jerusalem northward by Jifna, Mozaré, Tibneh, Nablus, and Jenin to Nazareth form a valuable contribution to Palestine topography. The account of the journey was also accompanied by special plans made by Capt. Gélis, of Ebal and Gerizim, Jericho, Amman, Hesban, Arak el Emir, &c.

In 1851–2 Van de Velde travelled through Palestine, and the result was his first map published on a scale of $\frac{1}{315000}$. Van de Velde used a 7-inch compass with two levels, a cross-threaded plunging telescope, and vertical semicircle; he had no aneroids or other means of determining altitudes. The map was based on Symonds' triangulation, and compiled from his own observations, with the compass bearings, itineraries, and astronomical observations of others; it was accompanied by a memoir, containing a rich store of authentic and well-arranged data.

After a second visit to the country in 1861–2, Van de Velde published a new edition of his excellent map, which, until the recent publication of Mr. Murray's Atlas, was the best map of Palestine.

In 1853, and again in 1862, Dean Stanley visited Palestine,

* The accuracy of Lynch's work has sometimes been questioned, but the position of one important point, the embouchure of Wády Zerka, which Van de Velde considered to be in error, was found to be quite accurate by Lieut. Anderson and myself.

and published the result of his travels in a book, 'Sinai and Palestine,' which has perhaps created greater interest in Biblical geography than any work that has appeared on the subject.

1850–55.—In his work 'Five Years in Damascus,' Mr. Porter gives a map embodying the results of observations made during his five years' stay in the country. The map contains much new and interesting information on the Ledja, Hauran, the Lebanon, and the water system of the Plain of Damascus, but unfortunately a mistake was made in the application of the variation, so that the relative positions of places are somewhat distorted. Bearings were taken with a compass, and altitudes with an aneroid.*

1855.—In a paper read before the Royal Geographical Society, Mr. Poole communicated the results of an examination of the western and southern shores of the Dead Sea and the Lisan. He made the depression by aneroid 1313·5 feet.†

1857.—In a paper read before the Royal Geographical Society, Mr. Cyril Graham gave an account of his travels in the Hauran and the district of El Harah, which had not previously been visited. His paper was accompanied by a route map containing a large number of new names of towns and villages.‡

1858.—An important journey in the Hauran and Ledja was made by the Prussian Consul at Damascus, Herr Wetzstein, who published an account of it in 1860, which was accompanied by a map by Kiepert. The instruments used by Wetzstein were a 7-inch sextant, a box chronometer, and a Schmalkalder's compass; his latitudes are from observations of the pole-star and circum-meridians of the sun; and the map contains much authentic information of the districts that he visited, which were previously little known.

In 1860–61 advantage was taken of the presence of French troops in Syria to make several reconnaissances, which were afterwards embodied in the "Carte du Liban," a beautifully executed map, published on a scale of $\frac{1}{200000}$. The detailed features of the country are correctly given, but the latitudes of many of the places are in error, and the work bears the appearance of being a series of military reconnaissances fitted together; unfortunately no memoir was published with the map, from which its claim to accuracy might be judged. To the same period belongs M. Renan's expedition to Phœnicia, the account of which is accompanied by some beautiful topo-

* 'Royal Geographical Society's Journal,' vol. xxvi. † Ibid., vol. xxvi.
‡ Ibid., vol. xxviii.

graphical maps and plans by Captain Gélis and other French officers.

In 1860–62 an Admiralty Survey of the coast of Palestine and Syria was made by Captain Mansel, R.N., assisted by Masters Hull and Christian, and a triangulation was carried over a portion of the country. During the progress of the Survey, Alexandria was connected with Malta for longitude by electric telegraph, and by 8 or 9 meridian distances by 13 chronometers carried round from Malta to Beyrout, Jaffa, and Alexandria, the results being most satisfactory. An astronomical base was measured between Hassan Cove, Beyrout, and the south point of Jezireh Island, Saida. The longitude of Beyrout was fixed from 3 chronometric meridian distances between Alexandria and Beyrout, and that of Saida from 4 chronometric meridian distances between Beyrout and Saida. The latitude was in each case fixed with the sextant by numerous observations of stars north and south of the zenith. The northern minaret of the Great Mosque at Damascus was connected with Hassan Cove, Beyrout, for longitude, by electric telegraph, and the latitude of the minaret fixed with the sextant. This placed the minaret in lat. 33° 30′ 30″ N. and long. 36° 18′ 24″ E. In addition to the accurate delineation of the coast line, and the preparation of charts on a larger scale of the harbours, a large number of points in the interior were fixed by astronomical observations and triangulation; the variation of the compass was carefully observed, and numerous altitudes were determined by barometer and angles of elevation and depression.

In 1863–4 Dr. Tristram visited Palestine, and published the results of his travels in the 'Land of Israel,' which was accompanied by a general map of the country, and a special map of the Dead Sea, that adds much to our knowledge of the topography of its western shores. In 1872 Dr. Tristram again visited Palestine, and spent some time in an examination of Moab; his account of his journey is now in the press, and the map which is to accompany it will give many new details of the topography of that district.* Dr. Tristram was fortunate enough during his visit to discover the remains of a remarkable palace at Umm Shittah, not far from the Damascus Haj route.

In 1863–4 the Duc de Luynes conducted an expedition to Palestine, the entire cost of which was defrayed from his own private means. He was accompanied by Lieutenant Vignes of the French Navy, and an accomplished geologist, Monsieur

* This work has since been published under the title of 'The Land of Moab.'

Lartet. These two gentlemen spent a month—8th March to 7th April 1864—in examining the Dead Sea, with the aid of a boat carried in sections from Jerusalem. They afterwards passed up the Jordan valley to Jisr Damieh, and thence passed by way of Amman, Hesban, Moab, and Petra, to the 'Arabah, which was carefully examined. Owing to the lamented death of the Duc de Luynes a full account of the expedition has not yet been published, but we already have an excellent map by Lieutenant Vignes, of the Dead Sea and its vicinity, including the 'Arabah, on a scale of $\frac{1}{240000}$; and M. Lartet has published a work on the geology of Palestine which is of the highest value. His paper on the Dead Sea treats the whole question of its origin, and the geological formation of its basin, in the most able manner, and his examination of the water-parting in the 'Arabah has shown that there is no ground for supposing that the waters of the Jordan ever entered the Gulf of 'Akabah.

In 1867 the Rev. F. W. Holland spent some time in exploring the peninsula of Sinai, and communicated an account of his journey, as well as of a former one in 1861, to the Royal Geographical Society in a paper published in Vol. xxxviii. of the 'Journal.' Mr. Holland's journey was performed on foot and alone, and he was enabled from his itineraries and numerous compass-bearings from the peaks, with barometrical and hypsometrical observations of their altitudes, to construct a map of the entire peninsula, which is inserted in Vol. xxxix. of the Society's 'Journal.' This map, when tested afterwards by the closer examination of the Survey of 1868-69, was found to be very accurate, and was of great use to the expedition; it was the first map upon which any attempt had been made to show in detail the peculiar topographical features of the peninsula, and is remarkable as the work of a single, unaided explorer.

In 1870 Captains Mieulet and Derrien, of the French État-Major, proceeded to Palestine with a view of constructing a map of the country; they commenced operations on the 10th May and worked till the 10th August, when they were recalled to France. A base line was measured on the plain of Acre, and from this, 21 stations were fixed by triangulation with a theodolite; the altitudes of 500 separate points were fixed, and more than 1000 square miles surveyed. The field sketches were made on a scale of $\frac{1}{100000}$, and contain all towns, houses, tombs, ruins, wells, springs, woods, &c.; the hill features are shown by contour lines, and the names are written in French and Arabic. The map is at present being prepared from the field sketches.

In 1871 Captain Burton and Mr. Drake made an exploration of the Tulúl el Safá, the volcanic region east of Damascus, and an account of their journey by Captain Burton has been published in No. 2 of Vol. xvi. of the 'Proceedings' of the Royal Geographical Society. A fuller account was published under the title 'Unexplored Syria,' with a map by Mr. Drake, which adds much to our knowledge of the Trachonitis.

In 1871-2 an Admiralty Survey of the Gulf of Suez was made by Captain Nares, R.N., in H.M.S. *Newport*, and the first sheet, extending from Tur to Rás Muhammed, has already been published.* In addition to the hydrographical features the charts show many new and important topographical details, especially with regard to the coast range running northwards from Tur, and the hills in the vicinity of Wády Gharandel.

The present year has been marked by the publication of the northern sheet of Mr. Murray's new map of Palestine, which is beautifully executed, and contains information derived from the most recent surveys and expeditions.

This portion of the subject can hardly be closed without alluding to the works of Thomson, Tobler, and Ritter, as well as to the articles by Mr. Grove in the 'Dictionary of the Bible,' all of which have largely contributed to our knowledge of the physical features of Sinai and Palestine.

I now pass to the more accurate surveys which have recently been made, commencing with that of Jerusalem, which may in some measure be said to have given rise to the subsequent operations. Early in 1864 the sanitary state of Jerusalem attracted considerable atteution, and several schemes were proposed for its improvement by providing an adequate supply of pure water for the inhabitants. The Baroness Burdett Coutts, having been informed that it was necessary in the first place to obtain an accurate plan of the city, at once placed a sum of 500*l.* in the hands of a committee of gentlemen interested in the subject, for that purpose. The committee requested Lord de Grey, then Secretary of State for War, to allow a survey to be made by a party of Royal Engineers from the Ordnance Survey under the direction of Sir Henry James, and obtained a favourable answer. It was, however, stipulated that Government should be put to no expense, and that an officer should accompany the party at his own cost, as the funds were not sufficient to defray his expenses. The survey was made by myself and five non-commissioned officers of the Royal Engineers, and on our return to England the cost of publication was

* The remaining charts of the Red Sea have since been issued.

defrayed by a grant from the Treasury, which has been more than repaid by the sale of the plans, photographs, &c. The plans are now so well known that it will be sufficient to mention here that they were made on the same scale and with the same accuracy as the Parish Plans of the Ordnance Survey, $\frac{1}{2500}$. Before the party left England, some doubt was entertained as to the possibility of making a close-contoured survey, which necessitated constant trespass on private property, of a town in which there was such a large Moslem population; but with a little care and management the difficulties soon disappeared.

The ground covered by the survey was triangulated with a 7-inch theodolite, and a chain survey then made of the whole, a 5-inch theodolite being used to lay out the longer and more difficult lines. The base was measured three times with a standard chain, and the mean of the three measurements, which had a range of half a link, was used for calculation. A traverse survey was made of the city and Haram Area with a 5-inch theodolite. The chain survey was plotted at Jerusalem, and traces made of the work, which were carefully examined on the ground, any inaccuracies or omissions being at once corrected. The ground was contoured at 10-foot intervals, with the exception of the city itself, in which the streets were levelled, and bench marks were cut at frequent intervals. The hill features were then sketched in on the ground, and plans of the most important buildings made. Such of the subterranean passages as were accessible were examined, and a few excavations made at important points. The plans were brought home in a finished state, and consisted of—

$\frac{1}{2500}$ plan of Jerusalem and vicinity, with 10-foot contours
$\frac{1}{10000}$ ditto with hill features.
$\frac{1}{500}$ plan of Haram Area.
$\frac{1}{200}$ and $\frac{1}{500}$ plans of Church of Holy Sepulchre and other buildings.

Whilst at Jerusalem I was requested to carry a line of levels from the Mediterranean to the Dead Sea, and from Jerusalem to Solomon's Pools, the funds in one case being provided by the Royal, and Royal Geographical, Societies, and in the other by the Syrian Improvement Society. After a careful reconnaissance of the intervening country, the line selected, as that which would give the best results, was one following the camel road up Wády Suleiman to Jerusalem, and thence the usual road to Jericho and the Dead Sea. As the expense of running two independent lines of levels would have been very great it was decided to run a single line with two instruments and two observers. The back and forward staves were read twice by each observer, and the results compared on the spot; if they lay within a certain limit, the instruments were moved to

another station, if not, the readings were taken again. From a comparison of the two sets of levels, it is certain that the limit of error in the ascertained depression of the Dead Sea does not exceed 4 inches. The rate of levelling varied according to the nature of the ground; the average number of stations in a day was 89, and the greatest interval between the staves was 8 chains, 4 on each side of the instrument. 35 bench marks were cut between Jaffa and the Mount of Olives, and 18 between the latter place and the Dead Sea, where a stone was sunk in the sand. These bench marks have been connected with the triangulation of the survey now in course of progress, and have enabled the surveyors to check the altitudes of many of their trigonometrical points. The party suffered considerably from the intense heat and the bad water. The depression of the Dead Sea was found to be 1292·13 feet on the 12th March 1865, but it was ascertained that in early summer the level of the sea is at least 6 feet lower; this would make the depression 1298 feet, and it is probably never greater than 1300 feet. An examination of the drift-wood on the shore of the lake showed that the water had stood 2½ feet higher during the winter, or at 1289·6 feet; there is thus a range of 10·4 feet, but whether it is an annual variation, or not, we had no means of ascertaining. This represents an enormous amount of evaporation, and it is to be hoped that advantage may be taken of the present survey, to establish a gauge by which we may arrive at the annual rise and fall. The Jordan is subject to two annual freshets, one during the rainy season, the other when the Lebanon snows melt, and at this time the supply far exceeds the evaporation; the highest level of the lake would probably be in January, the lowest towards the end of October. It may not be uninteresting here to give the results obtained by previous travellers:—

	Feet.		Feet.
Ordnance Survey, by levelling	1292·13	Russegger, barometer	1430
Lynch, by levelling*	1316·7	Von Wildenbruch, barometer	1441
Symonds, by triangulation	1312·2	Schubert, barometer	638
Lieut. Vignes, by barometer	1286·15	Bridges, barometer	1367
De Bertou, barometer	1377·	Poole, barometer	1316

The success which attended the Jerusalem Survey showed that the time had arrived when it would be possible to carry out a systematic examination of the whole country, and at a meeting held on the 22nd June 1865, an association was

* Lynch's line of levels was run in May, and from indications in his map the water appears to have been at that time very low. A small tongue of land shown by him as connected with the shore was in 1865 an island separated from the shore by water 6 or 7 feet deep.

formed for this purpose under the name of the Palestine Exploration Fund. Her Majesty graciously consented to become the Patron, and a committee was appointed to arrange matters of detail. A prospectus was prepared by Mr. George Grove, the indefatigable Honorary Secretary, to whose unceasing exertions much of the success of the Fund is due, and in this, the object was said to be the examination of the archæology, the manners and customs, the topography, the geology, as well as the botany, zoology, meteorology, &c., of the Holy Land. The committee decided that, in the first place, an expedition should be sent out "with the view of making such a general survey of the country as would enable the promoters of the Fund to fix on particular spots for further examination, and also to collect such special information as was compatible with the larger purposes of the Expedition, and would throw light on any of the points mentioned in the programme of the Exploration Fund." The committee did me the honour to offer me the command of the Expedition; and, accompanied by Lieutenant, now Captain, Anderson, R.E., and one sergeant R.E., I left England in November 1865. Landing at Beyrout we proceeded to Damascus, and after determining the position of the lakes to the east, proceeded to Banias; thence we travelled southwards to Hebron, and afterwards made an excursion along the Maritime Plain to Athlit. In some excursions which I had made from Jerusalem in 1864-65 I had been much struck by the character of the country as affecting its survey; the clearness of the atmosphere and extensive views from many points offer great facilities to the surveyor, whilst on the other hand the deep transverse valleys prevented free movement over the country, and the absence of spires or prominent points in the villages, combined with the uncertain character of the population, made it difficult to establish fixed trigonometrical stations. As under the circumstances of the Expedition it was impossible to carry out a satisfactory triangulation, I determined to make a reconnaissance of the country passed through, observing at the principal stations for time and latitude, and connecting them by azimuth lines with some known point. The results of the Expedition, which remained in the country about 6 months, were briefly as follows: Observations for time and latitude at 49 different stations; a line of azimuths from Banias to Jerusalem giving independent determinations of longitude for the points used, Mansel's position for the Dome of the Rock at Jerusalem being adopted as a fixed point; a reconnaissance on a scale of 1 inch to a mile of a district extending from Banias to Hebron, and embracing the whole backbone of the country; a reconnaissance of a large portion of the Maritime Plain; special surveys of the Sea of

Galilee and vicinity, Samaria, Beisan, and Mounts Ebal and Gerizim; an examination of the French map of the Lebanon, in which many errors were found; more than 50 plans of synagogues, churches, temples, tombs, &c.; and a number of tentative excavations at various points which yielded good results. A large number of photographs were taken, and two questions of some importance to the geography of the country were settled: one the point at which the stream from Wády Zerka enters the Jordan, the other the correct course of Wády Surar. There is not space to enter into the details of these and other results which have been published from time to time by the Fund. The method of conducting the reconnaissance will be best understood from a short description of its commencement; the latitude of Banias was carefully fixed by astronomical observations, and a similar determination was made of the junction of the Jordan and Banias streams, about 5 miles distant. These two places having been connected by compass bearings, a base was obtained on which to frame the triangulation to the mountains on both sides of the valley. Explorations on horseback were made in different directions over the valley, and the position of all the important points fixed by compass bearings to points previously determined. From Banias an azimuth line was observed, with a 5-inch altitude and azimuth instrument, to a prominent peak about 10 miles distant on the west side of the valley, and the latitude of our camp, pitched close to this peak at the village of Hunin, was determined astronomically, and the connection accurately made with the different places visited during the exploration in the valley, including the last camp at Banias. At Hunin we were on the water-parting, which was explored about 8 miles further north, to the great bend of the Leontes. From Hunin the water-parting was followed to Jerusalem, and this afforded great facilities for topographical reconnaissance, as a clear view was always obtained to great distances both on the east and west, and all important places visible within 8 or 10 miles fixed by triangulation. From Hunin the line of azimuths was carried to Jerusalem, the principal points used being Banias, Hunin, Alma, Sasa, Safed, Nazareth, Jebel Duhy, Mount Ebal, Mount Gerizim, Jebel Hazur, Jerusalem. At every camp the chronometers were carefully rated and compared; for latitude 10 observations of a north and 10 of a south star were made, and for time 5 observations of an east and 5 of a west star; the sun was rarely used, as we were generally reconnoitring or excavating during the day; the azimuth lines were run with a 5-inch alt. azimuth instrument, and the principal triangulation made with the same. Heights were determined by

aneroid.* The observations at Banias are given as an example for latitude and time,† and an example from the Sinai Survey is given for the method of reducing the azimuths.‡ The reconnaissance was carried out by Captain Anderson. The constant day and night work was very trying, but a short rest at Jerusalem soon restored the party to perfect health.

On our return to England I submitted a scheme for a regular survey of the country, but the committee, taking into consideration the extreme interest felt by everyone in Jerusalem, determined to devote their attention, for the time being, to excavations in the Holy City. In accordance with this decision an expedition was sent out in January 1867, under Captain Warren, R.E., neither Captain Anderson nor myself being able at the time to return to Palestine. The difficulties which Captain Warren had to encounter and the remarkable results which he obtained by his excavations are well known, and they hardly come within the scope of the present paper. He was, however, able whilst in Palestine to carry out some important reconnaissances, which have added much to our knowledge of the topography of the country. The reconnaissances of Captain Warren (since embodied in Mr. Murray's map of Palestine) were made at intervals during the excavations at Jerusalem, and were conducted in the same manner as those of the Expedition in the previous year.

They consisted of about 650 square miles in the Plain of Philistia, about 300 square miles on the west bank of the Jordan to the north of the Dead Sea, and about 1050 square miles to the east of the Jordan, as far as the Haj route in the desert. In addition, a sketch of the hills about the Jordan Valley was made as far as the Sea of Tiberias, including the plain of Beisan, a geographical description of the western side of the Dead Sea, also an account of Mount Hermon, together with plans, &c., of all the temples in Cœlo-Syria as far as at present known.

Capt. Warren was usually accompanied by a photographer (Sergeant Phillips, R.E.), or by other non-commissioned officers of Royal Engineers, and plans were made of all the ancient buildings and ruins met with; among others Nebo, Amman, and Jerash, together with photographs both archæological and geological, and illustrative of the manners and customs of the people.

* The Expedition was but poorly furnished with instruments, the only ones supplied being 1 8-inch sextant; 1 5-inch alt. azimuth instrument; 1 large azimuth compass; 1 prismatic compass; 4 pocket chronometers; 2 chains; 1 syphon barometer; 3 aneroids; 2 thermometers; 1 hygrometer. Three of the chronometers proved to be reliable instruments, and were found to have accumulated only errors of 2 and 3 minutes in 7 months.

† Appendix I. ‡ Appendix II.

I may mention photographs of the ruins of Marsada, Amman, and Jerash, also the hill desert of Sacha, and about the Dead Sea. Advantage was taken of Jacob-es-Shellaby's presence on Mount Gerizim to photograph the Samaritan colony, both in camp and when assembled for prayer on the evening before the Passover. These are the only photographs of the Samaritans known to exist.

Captain Warren came to the conclusion that, taking cost for cost, the results of reconnaissances in a country like the Holy Land (where every ruin is of importance) was not to be compared with the results to be obtained from a systematic trigonometrical survey, forming at the very least a skeleton outline, the substance of which could be filled in at any future period; and he urged upon the Committee the necessity for the survey which has now happily been commenced under such good auspices.

In Philistia, Ramleh being taken as a fixed point, a triangulation by means of true bearings and latitudes was carried down to Gaza, and as far east as Neby Samwil, thus checking the longitude of Jerusalem.

The principal heights and latitude and longitude of about 300 villages and ruins in this plain were obtained, and published in the papers of the Palestine Exploration Fund. It was observed that this fertile plain is being threatened by vast sand-hills, gradually advancing from the sea, put in motion by the prevailing surface wind; whole villages have been engulphed, and instances have been found where some landowners, more industrious than the rest, have from year to year patiently carried the advancing sand away from their plots of ground, until at the present time they are situated far below the surface of the sand, and entirely surrounded by it. The only chance of arresting the advancing enemy is united action on the part of the inhabitants, and the planting of pine trees (as at Beyrout).

In making this reconnaissance of Philistia, the existing maps were of no assistance, for though externally accurate in parts, with regard to the relative position of certain ancient towns one to another, the general positions were entirely wrong; thus clearly showing the necessity for a correct outline of the country on which the ancient ruins found from time to time by travellers could gradually be filled in.

Three separate expeditions were made when filling in the 1350 square miles about the Jordan Valley. The reconnaissances extend from the edge of Captain Anderson's survey of the water-parting between Jerusalem and Nablus to the Jordan, and then across Gilead to the elevated Plain of Arabia, as far as the Haj route, being from north to south 30 miles, to east of

Jordan 30 miles, to west 15 miles. The greater portion of the country had not been mapped on the ground before, the portion to east of Jordan, shown in Van de Velde's map, having been constructed by him at Jerusalem from the itineraries of travellers and information obtained from natives.

This work was performed by Captain Warren at a time when the Bedawin he was with, were up in arms against an invading Turkish army—a price being placed on the head of the Sheikh who accompanied him. They were obliged to retreat suddenly from Jerash, the Turkish troops occupying that ruin on the following day.

The ruined town of Nebbeh, close to the Springs of Moses, was discovered; it is near the mountain of the same name, and thus helps to settle the site of Nebo, discovered independently a year or two previously by three distinguished explorers.

The heights of several hundred places have been obtained and published, together with a list of Arabic names met with; the latitudes and longitudes have also been worked out, but it has not been considered necessary to publish them, as the American Expedition is in possession of the reconnaissance sheet, and will be able to work out the positions with more accuracy by a trigonometrical survey, than they could be, obtained astronomically with the instruments used. Captain Warren is the first who has been enabled to examine and describe the whole Jordan Valley from Tiberias to the Dead Sea (Lynch's survey, having been of the river and its banks). In February 1868 he, with a party, traversed the western side as far as the Jisr Mejamia, returning by the eastern side, and continuing as far as Callirhoe; he was arrested in the journey to Kerak by the illness and death of one of the party. The overflowing of the banks of the Lower Jordan was witnessed, by which operation whole tracts of corn were irrigated and the land fertilised.

The excursion to Marsada and Jebel Usdum was made in midsummer, under a tropical heat, the thermometer on one occasion registering 110° after sunset; nevertheless some good photographs were taken, and the Serpents' Path at Marsada, described by Josephus, was discovered and scaled.

In the Lebanon, the old idea that Mount Hermon was the Kibleh to which all the temples were turned, was disproved, it being ascertained beyond doubt that the entrances of all the temples were eastward. A plan was made of the summits of Hermon, together with the sacellum and ancient ring or *towaf*.

In 1868 a fund was raised, principally by the exertions of the late Mr. Pierce Butler, for an examination of the peninsula of Sinai, and Sir H. James was requested to undertake the direction of the Survey. The premature death of Mr. Butler when

on the eve of starting for the East, caused some delay, but everything was arranged by the 24th October 1868, when a party, consisting of Captains Wilson and Palmer, R.E., Rev. F. W. Holland, and five non-commissioned officers Royal Engineers from the Ordnance Survey, sailed from Southampton. The Expedition was joined in Egypt by Mr. E. H. Palmer and Mr. Wyatt, the former an accomplished Arabic scholar, the latter a naturalist. The Expedition was actively employed in the desert for five months, with the following results:—

At 36 encampments there were 83 sets of observations for determining the time, 3 for longitude and 201 for latitude. The direction of the true meridian was determined at 6 different stations, and miscellaneous observations for azimuth and magnetic variation were taken at 24 points of the survey.

Two special surveys, upon a scale of 6 inches to a mile, the one of Jebel Músá and its vicinity, the other of Jebel Serbál and its vicinity, and respectively 17 and 13½ square miles in extent, were completed, and the plans drawn. In the execution of these surveys, two base lines were measured, and the relative positions and altitudes of 68 trigonometrical stations determined by triangulation. The stations, 55 of which were observed from, ranged up to an altitude of 2700 feet above the base line at Jebel Músá, and 4800 feet above that at Jebel Serbál.

The special surveys likewise comprised 63 miles of traversing, 45 of levelling, and 4½ of contouring, and were completed by hill sketches. They were connected by a traverse survey 29 miles long, and accurate models have since been made from them.

The relative position and altitude of 56 mountain peaks were determined by triangulation from 25 selected points. A series of barometrical and hypsometrical observations were taken at Suez, and at the camps of the Expedition, as well as on many of the peaks themselves, so as to enable their levels to be referred to that of the Red Sea. Seven hundred miles of route survey were made, extending over many parts of a district which may be roughly described as bounded at its four extreme points by Suez, Ain Hudherah, Jebel eth Thebt, and Tur, and embracing an area of 3600 square miles—about twice that of Kent.

The instruments used in the special surveys were the 5-inch theodolite and 8-inch spirit-level; the hill sketching was filled in with 2¾-inch prismatic compasses and small aneroids. For the general survey 8-inch and 6-inch sextants, a 6-inch altitude azimuth theodolite, one box and three pocket chronometers, a 5-inch prismatic compass on stand, 5-inch theodolites, pocket compasses, barometers, hypsometers, &c.

The maps which have been published, are, special surveys of Jebels Músá and Serbál, on a scale of 6 inches to a mile, in outline, and with hill shading; a map of the general survey, on a scale of 2 miles to an inch; and a map of the peninsula, on a scale of 10 miles to an inch.

The difficulties of carrying out a chain survey in a country such as Sinai, with lofty mountains of bare rock, were of no ordinary character; cairns had to be erected on the summits of peaks so difficult of access that it was sometimes a good day's work to get to and from a single station, and on a few occasions the instruments had to be hoisted up the steep ledges by ropes. Nor was the actual observing an easy matter, for often after reaching a cairn, in a violent perspiration from the intense heat of the sun in the sheltered valleys, the fingers became so numbed by the keen wind on the heights that they could hardly work the screws of the instruments.

On reaching Suez it was at once apparent that the labour and expense of connecting Suez with the Sinaitic Mountains by triangulation would be very great, and it was decided to adopt a similar plan of operations to that followed in the Palestine Survey of 1865–6, viz.:—

1st. To establish the position of at least one series of selected peaks between Suez and Jebel Músá by observing the latitude of the peaks, and their reciprocal true bearings from one another; this—Jebel Serbál being one of the peaks as well as Jebel Músá—would give the true position of the special surveys and of several points between them and Suez.

2nd. From the points thus fixed, and also from the principal trigonometrical stations in the special surveys, to extend a triangulation as far as possible right and left of the main line of peaks.

3rd. To fill in the topographical details by route and reconnaissance surveys, checked by bearings to known points, and observations for latitude at the camps. This plan was adhered to throughout.

The mode of determining the differences of longitude between the points in the series between Suez and Jebel Músá is given in Appendix II.

The altitudes of the two permanent camps at Jebels Músá and Serbál were determined by a careful comparison of a long series of observations made at them with a Gay-Lussac barometer, with a series made at Suez by Mr. Andrews, of the P. and O. Company; and to these altitudes all other observations in the peninsula were referred. The instruments used in the field were 1 Gay-Lussac barometer, 8 aneroids, and 3 hypsometers; and a comparison of the 9 barometers was made by myself

every morning and evening when the regular meteorological observations were made; the aneroids were also compared by the officers using them on leaving and returning to camp. As I believe it to be one of the most complete series of barometrical readings which has been made on an expedition of this kind, I have given in Appendix III. a note on the subject by Captain Palmer, R.E., taken from the published account of the survey, which is not within every one's reach.

Meteorological observations were made at Suez, and at the camps at Jebels Músá and Serbál, and the results are published in the account of the survey.

In addition to the survey, special plans were made of all ruins met with, the numerous cells and tombs examined, impressions and photographs taken of the Egyptian remains and inscriptions, and several small excavations. Geological, botanical, and natural history specimens were collected, and, thanks to Mr. Palmer, the native names and traditions were obtained in the most authentic and complete manner. Mr. Palmer was also able to set at rest for ever, the questions connected with the Sinaitic inscriptions, and by the discovery of several in bilingual characters, to form a complete alphabet. The inscriptions throw little light on the history of the peninsula, but are of great value to philologists; they date from about the 1st century before Christ to the 3rd and 4th A.D.

On the return of the Expedition to Egypt, careful measurements were made of the Nilometer and the base of the Great Pyramid.

In November 1869 Mr. Palmer was sent out by the Fund to explore the Desert of the Tih and part of Moab, and he was accompanied on his journey by Mr. C. F. Tyrwhitt Drake. Leaving Suez, Mr. Palmer proceeded, in the first instance, to Jebel Músá, and thence to Ain Hudherah; from this point he proceeded up Wády Byar, and ascending the Tih by a pass not previously known crossed over to Nakhl. From Nakhl Mr. Palmer travelled northwards to Beersheba and Hebron, visiting *en route* El Aujeh, S'baita, Khalasah, and other places of which little was previously known; plans of these places were made, photographs taken of the ruins, and a large amount of valuable information collected. From Jerusalem Mr. Palmer travelled southwards to Hebron, and thence for the greater part of the way by an entirely new route through the Negeb to Petra; on this occasion he was fortunate enough to discover the ruins of Abdeh, the ancient Eboda, and came upon several traces of the old Roman road from Gaza to Petra. From Petra, near which a new rock-hewn town was found, he proceeded up the 'Arabah to the Dead Sea, and after an examination of the Lisan

ascended by Shihan to Moab; here he spent some time examining the country with a view of discovering inscriptions, and then crossed the Jordan to Jerusalem. The whole of Mr. Palmer's journey was accomplished on foot in native costume, and a careful sketch of his route was made with a prismatic compass, and by pacing; the accuracy of the work may be judged from the fact that on closing on Hebron the amount of error was only 4½ miles. The geographical results of the journey are very valuable, and the discovery of traces of extensive cultivation, principally vine culture, in former days to the extreme southern limit of the Negeb is especially interesting. Of great value also, is the collection of the correct nomenclature and native traditions, a work for which Mr. Palmer was so eminently qualified; and his account of his journey is one of the most interesting and valuable papers which have been contributed to the quarterly publication of the Fund.

Having failed to obtain permission to excavate in the Haram Area at Jerusalem, the attention of the Committee was turned to the survey; it was felt that Biblical research had reached a point at which an accurate map was indispensable for its further progress, and that the strong tide of Western civilisation which had recently set in, would sweep away for ever many old names, traditions, and relics of the past, if they were not rescued by the speedy completion of an accurate and systematic examination. A resolution was therefore passed at the Annual General Meeting of the Fund in June 1871, that immediate steps should be taken to complete the survey of Palestine.

At the same meeting it was announced that a Palestine Exploration Fund had been formed in America to co-operate with the English Fund, and that an arrangement had been made by which the English party was to survey the country west of Jordan, whilst the Americans took the east.

Captain Stewart, R.E., was appointed to the command of the English party, and two non-commissioned officers, good observers and surveyors from the Orduance Survey, were selected to accompany him. Mr. Tyrwhitt Drake, who was at the time in Palestine, also consented to join the party and take charge of the nomenclature, traditions, natural history, &c.

The objects of the Expedition, as embodied in Captain Stewart's instructions, were briefly:—

1. To obtain an accurate map of the country, on which, in addition to the topographical features, should be laid down the sites of all towns, villages, roads, &c.

2. To collect, as far as possible, the native names and traditions connected with the various places.

3. To make tentative excavations where necessary.

4. To carry on a series of meteorological observations.

5. To make such notes as might be possible on the geology of the country, its botany, zoology, &c.

6. To take any opportunity which might offer of making excavations at Jerusalem which would lead to decisive results.

7. To examine and make plans and drawings of interesting archæological remains in the country.

8. To carry out generally the scheme which had been proposed in the several prospectuses issued by the Committee.

The scale approved by the Committee for the general map was 1 inch to a mile, whilst plans of localities having a special interest, and of important buildings, were to be made on such larger scale as circumstances might require.

The projection selected was Sir H. James's Rectangular Tangentive Projection, and a series of sheets were prepared by Captain Bailey, R.N., embracing the whole country. Each sheet contains 20′ of lat. and 30′ of long. As the same projection and arrangement of the sheets has been, I believe, adopted by the Commander of the American party, there will be no difficulty in combining the results of the two surveys. The coast line was laid down on the sheets from the Admiralty Survey, and Captain Mansel's longitudes of Jaffa, Acre, and Beyrout were taken as correct.

The instructions for the survey pointed out the vicinity of Ramleh, on the plain east of Jaffa, as the most suitable locality for the measurement of a base, and recommended the connection of the base as early as possible with a common point of the Admiralty Survey at Jaffa, and with the triangulation of the Jerusalem Survey. When this was completed the triangulation was to be carried northwards and checked by the measurement of a second base on the plain of Esdraelon.

Under ordinary circumstances the whole country would have been triangulated, and the points laid down before the survey was commenced; but in the present instance it was, for several reasons, deemed advisable to fill in the details as the triangulation proceeded. The instruments supplied for the triangulation were one 7-inch and two-5 inch theodolites.

Some years previously, meteorological observatories had been established by the Fund at Beyrout, Nazareth, Jaffa, and Gaza, whilst an observatory under Dr. Chaplin's care had been in full work at Jerusalem since 1864. A full set of instruments, with a portable observatory designed by Elliott and Co., were supplied to Captain Stewart, and he was requested to make arrangements with the other stations for making, as far as possible, simultaneous observations.

Mr. Glaisher very kindly undertook the direction of the meteorological work, and has contributed some valuable papers on the results already obtained, to the quarterly publication of the Fund.

On the 8th November 1871, Captain Stewart landed at Jaffa, and he and his party immediately set to work on the necessary preparations for the conduct of the Survey. A camp was established at Ramleh, a base line measured, and the first points for the triangulation selected, when, on the 25th November, Captain Stewart was unfortunately attacked by a severe illness which compelled him to return to England. In consequence of Captain Stewart's sudden illness, the duties connected with the Survey devolved upon the two non-commissioned officers he had taken out with him—Serjeant Black and Corporal Armstrong—and I would take this opportunity of speaking in the highest terms of the general accuracy of their work and of the judgment shown in the selection of points for the triangulation. On the 17th December Mr. Drake arrived from Damascus, and taking over the charge of the Survey from Captain Stewart, joined the camp at Ramleh. The varied nature of the duties which Mr. Drake was suddenly called upon to perform, may be gathered from the programme of the Survey, and the Committee are deeply indebted to that gentleman for the able manner in which he carried on the work, and for the readiness with which he undertook the responsibility attached to it. On the resignation of Captain Stewart, which followed his return to England, Lieutenant Conder, R.E., was appointed as his successor, and assumed the charge of the Survey on his arrival at Nablus on the 17th July 1872. Since this date the progress of the Survey has been rapid and steady, and some idea of Lieutenant Conder's exertions since he joined, may be gathered from the fact, that, in addition to many beautiful sketches, we are indebted to him personally for the delineation of the hill features of the area surveyed, and for a geological map of the same district.

The base selected near Ramleh was measured three times with a common chain which had been compared with a standard; the three measurements agreed well together, and gave a mean length of 22183·8 feet, or 4·2 miles, the accuracy of which was tested by one of the usual methods. The position of the base with regard to the meridian was determined by observations of Polaris, and a series of observations for latitude were made at Ramleh, giving results which agreed excellently with those derived by triangulation from the Admiralty latitude of Jaffa.

By the end of January, Serjeant Black was able to report that

the triangulation had been carried away from the base line in a series of well-shaped triangles extending over 100 sqnare miles, that 80 square miles had been surveyed and laid down on the sheets, and that a connection had been made with a common point of the Admiralty Survey at Jaffa, and with a bench mark on the line of levels from Jerusalem to Jaffa. During February and March, 100 square miles were triangulated and snrveyed, and a complete connection established between Jaffa and the triangulation of the Jerusalem Survey.

Mr. Drake, very justly deeming it unadvisable to expose men new to the climate, to the great heat of the maritime plain in summer, determined to push the triangulation northwards over the hill country towards Nablus, and by the 17th July, when Lieutenant Conder arrived to take charge of the Survey, 560 square miles, partly of the most difficult country, had been triangulated, surveyed, and drawn on the sheets.

In September a second base, 23810 feet, 4½ miles long, was measured on the flattest portion of the great plain of Esdraelon, and connected with the triangulation. It lies within 4° of north and south, and its ends have been marked in a most durable fashion by cairns of stone set in a sort of mortar of fresh-slaked lime. This base was also measured three times, and further checked by observations from its ends and from a point near its centre. Considering the many difficulties attending the work the calculated length of the line agrees well with the measured one.

From this base the triangulation was extended to the north and west, picking up several points used in the reconnaissance of 1865-6, and by the 20th January of this year (1873), Lieutenant Conder was able to report, that the triangulation had been carried to Haifa and Carmel, and that 1250 square miles had been completed and drawn on the sheets. The diagrams which I exhibited to the Society showed the principal triangulation and the area which has been surveyed and plotted; the original plans were in Palestine, but the tracings sent home by Lieutenant Conder were lent for inspection by the Palestine Fund.

The Survey is now in progress between Carmel and Jaffa, and Lieutenant Conder hopes before the hot weather sets in to complete this portion of the work.*

In addition to the triangulation, observations for latitude have been made at the principal places, and it is satisfactory to

* The Survey now extends over 1800 square miles, $\frac{1}{11}$ths of the whole area of Palestine, whilst the monthly rate has been increased to 180·89 miles, being an increase of nearly 30 per cent. on the maximum attained before Lieutenant Conder joined the Survey. Twelve special surveys have also been made of important localities, and the geological map has been continued.

find that where these can be compared they agree well with Captain Mansel's observations, and that the position of Acre, as derived from the triangulation, differs but slightly from that laid down on the Admiralty chart. The altitudes are determined by reciprocal angles of elevation and depression, as well as by aneroid barometer, and frequent observations are made for variation. On the original maps the hills are properly hachured according to a scale of shade, the principal slopes being taken with an Abney's level. Lieutenant Conder and Mr. Drake are not, however, content with making a mere modern map; they are intent upon making a thorough examination of the whole country. To these additional labours only a brief allusion can be made here.

Not only is every ruin, however small, visited, but a description of it is written on the spot, plans and sketches made of it, if of sufficient importance, and occasionally slight excavations. The result of this is a mass of most interesting plans and papers, some of which have already been received in England; the greater portion, however, are still in Palestine, Lieutenant Conder being unwilling to trust such valuable documents to the post-office; but it is hoped that Mr. Drake, who is expected home shortly, will bring them with him. In connection with this subject it may be mentioned that the old Roman roads through the country are carefully traced out and laid down on the map, and from this source alone we may hope to recover many lost sites.

Meteorological observations are made at all the camps under instructions supplied by Mr. Glaisher, and at times, as nearly as possible, the same as those of the fixed observatories. This will give valuable information on the climate of Palestine.

Geological specimens are collected, and a geological map of the country is being prepared, by Lieutenant Conder; amongst the results already obtained are the discovery of several basaltic outbreaks previously unknown, and some ancient mines in the vicinity of Carmel.

The names of all ruins, valleys, hills, and other natural features are collected by Mr. Drake, whose long residence in the country, and familiarity with the native character and Arabic language, renders him peculiarly well fitted for this important and difficult task. He has already succeeded in identifying several lost Biblical localities, and we may expect a rich harvest from his exertions.

Mr. Drake also collects all native traditions, and is a close observer of the existing manners and customs of the people. He is also engaged in forming a collection of botanical and zoological specimens.

The difficulties which the surveying party have had to encounter have been by no means inconsiderable: the work has been carried on in one of the most trying climates in the world, and in the midst of a turbulent population with but slight support from the local government; cairns have been pulled down as soon as erected, and in some places the opposition of the natives has taken the form of open hostilities. The results which have been obtained are largely due to the tact which the officers have shown in their dealings with the natives, and under such control we may hope for a successful completion of a work which has well been described as "a new phase in geographical research."

In conclusion it may be mentioned that, according to the latest reports from Beyrout, Lieutenant Steever, of the United States Engineers, had completed the outfit of his party and had left for the country east of Jordan. We may thus hope to obtain at an early date interesting details of the progress of the American Expedition.*

APPENDIX I.

CAMP XII.—BANIAS, December 31, 1865.

South Star, "Sirius," for Latitude.

Observed Meridian Double Altitude.				Observed Times.		
°	′	″		H.	M.	S.
80	28	30	.. ..	9	30	21·6
80	28	20	.. ..	9	30	26·0
80	28	20	.. ..	9	31	29·6
80	28	20	.. ..	9	31	38·0
80	28	20	.. ..	9	32	36·0
80	28	10	.. ..	9	33	08·0
80	28	0	.. ..	9	33	47·6
80	28	05	.. ..	9	34	19·6
80	28	00	.. ..	9	34	32·4
80	27	55	.. ..	9	35	29·2

* By recent accounts the American party had measured a base line on the plains of Moab, and 400 square miles had been triangulated and filled in. The archæological and scientific departments of the expedition had also been very successful.

North Star, "Polaris," for Latitude.

Observed Double Altitude.			Observed Times.		
°	′	″	H.	M.	S.
67	31	25	8	40	20·4
67	30	50	8	41	03·6
67	30	25	8	41	30·6
67	30	00	8	42	18·4
67	29	25	8	42	52·4
67	28	50	8	43	34·4
67	28	20	8	44	12·4
67	28	10	8	44	48·0
67	27	25	8	45	26·4
67	27	00	8	46	18·4

	°	′	″
South Star	33	14	38·4
North Star	33	14	53·1
Mean determination	33	14	45·8

"Procyon" for Time (West Star).

Observed Double Altitude.			Chronometer Times.		
°	′	″	H.	M.	S.
103	50	0	8	32	56·4
104	0	0	8	33	28·0
104	10	0	8	33	59·2
104	20	0	8	34	29·6
104	30	0	8	35	01·2

"Aldebaran" for Time (East Star).

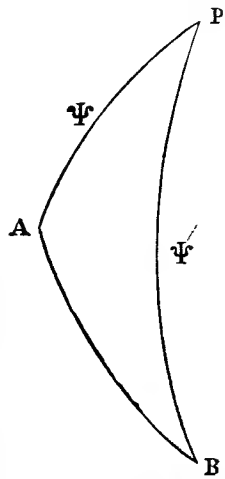
Observed Double Altitude.			Chronometer Times.		
°	′	″	H.	M.	S.
105	0	0	8	49	57·2
104	50	0	8	50	22·0
104	40	0	8	50	47·0
104	30	0	8	51	12·0.
104	20	0	8	51	36·4

	H.	M.	S.
West Star, Chronometer slow ..	2	25	40·43
East Star " " ..	2	25	42·02

Mean Chronometer error = 2 H. 25 M. 41·23 S. at 11 H. 38 M. M. T.

APPENDIX II.*

Longitude.—The differences of longitude between the points selected as initial stations of the Survey were determined as follows:—



Let A and B be two stations on the surface of the spheroid visible from one another, A P = ψ, B P = ψ' their observed colatitudes, the angles A and B their reciprocal true azimuths, and A P B the required angular difference of longitude. Then, by spherical trigonometry,†

$$\cot \tfrac{1}{2} P = \frac{\cos \frac{1}{2} (\psi' + \psi)}{\cos \frac{1}{2} (\psi' - \psi)} \tan \tfrac{1}{2} (A + B), \qquad (1)$$

which determines P.

But, as the angles at A and B may not have been measured with perfect accuracy, it is necessary to compute the small quantities by which the observed azimuths must be corrected. The following method of doing so has been kindly suggested by Lieut.-Col. A. R. Clarke, C.B., R.E.:—

Let λ be the latitude of A, λ' the latitude of B, the angles A and B the true azimuths, n n' the normals at A and B. Also let k be the chord line joining the two stations A and B, and μ μ' the angles made by this chord with the normals at A and B, so that $90° - \mu$, $90° - \mu'$ are the mutual depressions of those points.

Then, from formula (7), page 231 of the 'Account of the Principal Triangulation of the Ordnance Survey,' in which a a', $\frac{a}{\Delta}$ $\frac{a}{\Delta}$ correspond respectively to A B, n n' in this statement of the problem, and ω is the difference of longitude, we get—

$$\frac{\sin \mu \ \sin A}{\sin \mu' \sin B} = \frac{n' \cos \lambda'}{n \cos \lambda}.$$

But, from the two last equations on the same page,‡ it may be proved that μ and μ' are so nearly equal, that we can put $\frac{\sin \mu}{\sin \mu'} = 1$ without appreciable error. Hence,

$$\frac{\sin A}{\sin B} = \frac{n' \cos \lambda'}{n \cos \lambda} = m \text{ (say)}. \qquad (2)$$

$$\therefore \sin A = m \sin B. \qquad (3)$$

Suppose α and β to be the observed azimuths, and let x y be the corrections to be applied to them. Then, by (3),

$$\sin (\alpha + x) = m \sin (\beta + y);$$

and, since x and y are small,

$$\sin \alpha + x \cos \alpha = m \sin \beta + m\, y \cos \beta$$
$$= m \sin \beta + \frac{\sin \alpha \cos \beta}{\sin \beta} y$$

---

* From Ordnance Survey of Sinai.

† Equation (1) is true for the spheroid as for the sphere.

‡ See also examples, lines 9 and 10, page 235 of the same work.

$$\therefore 1 + x \cot \alpha = m \frac{\sin \beta}{\sin \alpha} + y \cot \beta$$

$$\therefore x \cot \alpha - y \cot \beta = m \frac{\sin \beta}{\sin \alpha} - 1. \qquad (4)$$

From this and $x^2 + y^2$, a minimum, x and y are to be obtained. Or, by logarithms,

$$\log \sin (\alpha + x) = \log m + \log \sin (\beta + y). \qquad (5)$$

The following case is given as an example of the reduction :—

Example.—At Jebel Bisher (A), in latitude 29° 40′ 15″ N., the azimuth of station on Jebel Hammám Far'ún (B), in latitude 29° 11′ 0″ N., was observed to be 178° 34′ 24″, the observed azimuth of A from B being 358° 35′ 30″, or N. 1° 24′ 30″ W. Required the difference of longitude.

Here,

$$\lambda' = 29° \, 11' \, 0'', \; \lambda = 29° \, 40' \, 15''.$$

By (2),

$$m = \frac{n' \cos \lambda'}{n \cos \lambda} \therefore \log m = \log \left(\frac{n' \cos \lambda'}{n \cos \lambda} \right)$$

$$\left.\begin{array}{r} \log n' = 2 \cdot 0066189 \\ \text{A. C. } \log n = 7 \cdot 9933704 \end{array}\right\} \text{Geodetical Tables, Ordnance Survey.}$$

$$\begin{array}{rl} \cos \lambda' & = 9 \cdot 9410461 \\ \text{A. C. } \cos \lambda & = 0 \cdot 0610384 \\ \hline & 0 \cdot 0020738 = \log m. \end{array}$$

Now, by (5),

$$\log \sin (\alpha + x) = \log m + \log \sin (\beta + y)$$

$$\therefore \log \sin (178° \, 34' \, 24'' + x'') = \cdot 0020738 + \log \sin (1° \, 24' \, 30'' + y'')$$

$$\therefore 8 \cdot 3961550 - \cdot 0000845 \, x = \cdot 0020738 + 8 \cdot 3905391 + \cdot 0000856 \, y$$

$$\therefore 845 \, x + 856 \, y = 35421.$$

It will be sufficiently correct to substitute for this equation the following—

$$x + y = 42,$$

and the values of x and y will be, $x = 21''$, $y = 21''$, and the observed azimuths, corrected with the smallest possible corrections, will become—

$$A = 178° \, 34' \, 45'', \; B = 1° \, 24' \, 51'' \text{ (the true azimuths)}$$

$$\therefore \tfrac{1}{2} (A + B) = 90° - 12'';$$

and, by (1),

$$\cot \tfrac{1}{2} P = \frac{\cos 60° \, 34' \, 22''}{\cos \; 0° \, 14' \, 37''} \cot 12'',$$

whence

$$P = 49''.$$

It is obvious that, in determining differences of longitude by this method, the smaller the angle at which the line connecting the two stations is inclined to the meridian, the more independent will the result be of any small errors in latitude. In the Sinai Survey, these angles were sufficiently small to promise good results,* and the extreme clearness of the atmosphere was very favourable both to the azimuth observations and for accurate determinations of latitude; while, from Jebel Hammám Far'ún southward, there was an abundance of well-marked peaks to select from. The longest line used in these observations was that connecting Jebel Hammám Far'ún with Jebel Serbál, a distance of about fifty-five miles.

The longitudes of the survey are all expressed in relation to Commander

* Jebel Músá bears about S. 40° E. from Suez.

Mansel's longitude of Suez Hotel, 32° 33′ 29″ E.; this was found by telegraph, and depends upon the longitude of Alexandria Lighthouse being 29° 51′ 40″ E.

Three values for the difference of longitude between Suez and Jebel Músá were obtained by the method described above; they are,

	Difference of Longitude.					Longitude of Jebel Músá.		
	°	′	″			°	′	″
1st Value ..	1	25	30	E. equivalent to		33	58	59 E.
2nd „ ..	1	25	32	„	„	33	59	1
3rd „ ..	1	25	34	„	„	33	59	3
Mean	1	25	32	„	„	33	59	1

This value was checked by observations from Jebel Músá and Jebel Abu Mes'úd to Jazirat Tirán in the Gulf of 'Akabah, with the following results:—

	Difference of Longitude.					Longitude of Jebel Músá.		
	°	′	″			°	′	″
1st Value ..	0	33	35	E. equivalent to		33	59	5 E.
2nd „ ..	0	33	27	„	„	33	59	13
Mean	0	33	31	„	„	33	59	9

For final result,

	Longitude of Jebel Músá.		
	°	′	″
Mean from Suez	33	59	1 E.
„ „ Tirán	33	59	9
Mean longitude of Jebel Músá ..	33	59	5 E.

This value has been adopted, and it is probably within 5″ of the truth.

APPENDIX III.

DETERMINATION OF ALTITUDES.

The altitudes of a large number of points in the peninsula—214 in all parts of the country, besides the 68 trigonometrical stations in the special surveys—have been determined by various means and with various degrees of accuracy. The greater number of the results are contained in the Tables; all of them, with three or four exceptions, have been written on the maps and plans. The datum-level, to which all the heights refer, is that of mean tide at Suez. One mountain barometer and two Gay-Lussac barometers, eight aneroids, and three hypsometers, were used in the determinations. One Gay-Lussac was left, with other meteorological instruments, at Suez, and registered daily, A.M. and P.M., by Mr. Andrews, of the Peninsular and Oriental Company. The mountain barometer was unfortunately injured beyond hope of repair, on the way from Suez to Jebel Músá, by the conduct of a refractory riding-camel, which succeeded in bringing the instrument and the corporal carrying it, to the ground. The Gay-Lussac happily suffered no harm, and became the standard at our permanent camps, to which, in connection with the Gay-Lussac at Suez, all other barometric readings were ultimately referred. The whole of the barometric and hypsometric observations have been reduced at Southampton by Quartermaster James Steel, R.E. He has brought great experience to bear upon the subject, and we are indebted to him for a laborious and, as far as could be, successful analysis of a very puzzling and complicated mass of

figures. I will endeavour to indicate the means by which the various results were arrived at, and the general conclusions to be drawn from them.

1. The Gay-Lussac barometer was kept stationary at the special survey camps—six weeks at Jebel Músá, followed by ten weeks at Feirán, and then a second period of five weeks at Jebel Músá. It was registered daily, at times to correspond with the registers at Suez, and all aneroids in camp were constantly compared with it. The altitude of each permanent camp was thus concluded from a comparison of long series of readings of the two standards. The formula used in the reductions was—

$$H = 60345 \cdot 5 \left\{ [\log B - \log b\,(1 + 0000897\,(\tau - \tau')] \times [1 + \cdot 0010652\,(t + t')] \times [1 + \cdot 002695 \cos 2\,\phi] \right\},$$

where H represents the difference of height between the two stations, ϕ the latitude midway between them, and B b, $\tau\,\tau'$, $t\,t'$, the heights of barometers, temperatures of mercury, and temperatures of air, at the lower and higher stations respectively.

In the reductions of the aneroid readings taken in the course of the general survey, it was considered sufficiently accurate to use a mean latitude (ϕ), a mean pressure (B), and mean temperatures for the whole. A table of altitudes for every $\frac{1}{10}''$ of pressure, from the sea level to 8,500 feet above it, was calculated with these data. The aneroid readings were corrected for index error, and for any deviation at the time of reading, from the mean pressure both at Suez and at the permanent camp, and the altitudes were then obtained from the table by interpolation.

2. The lines of levelling and the computed relative heights (by vertical angles) of the trigonometrical stations in the special surveys were all referred to the levels of the respective permanent or special survey camps, and their true altitudes thence obtained. Then, from these trigonometrical stations, we determined by vertical angles the altitudes of the greater number of the peaks of the general triangulation, the cluster about each special survey being computed separately.

3. During the geographical survey, aneroids had mainly to be depended on. They were observed at our camps and latitude stations, at the crossings and mouths of wádies, at watersheds, and on all the peaks we ascended. The registers of the different instruments were at first very perplexing and did not seem likely to lead to good results. The readings of three out of the eight for some time defied all attempts to harmonise them; but it was at length discovered, on close investigation, that their index errors had been effected by a uniform law. The Gay-Lussac had been the means of furnishing trustworthy altitudes of the two permanent camps, and a comparison of the index errors of the three aneroids at these stations with their errors at the sea level pointed to the conclusion that these errors varied in direct proportion to the pressure. This was verified by a scrutiny of the aneroid readings at the higher trigonometrical stations (of known altitude), when the same law was found to hold good. It thus became possible to compute a sliding-scale of approximate index error for each instrument, by which its reading at any altitude from the sea-level to 8500 feet could be corrected. The errors did not all increase in the same direction. Two aneroids gave the low plus value at the sea-level, the high value on high ground; but, with the third, the error varied in the contrary direction, and so tended to correct the others when used in connection with them. The results from these three aneroids served to check those from the other five, the index errors of which, did not appear to have been regulated by any known or discoverable law.

By this means fair determinations were no doubt obtained in the majority of cases. The value to be attached to them was tested in several instances by

reference to the aneroid readings at points of known altitude.* In eight out of twelve such comparisons it was found that the results, after being corrected by the sliding-scales of error, agreed pretty closely with the trigonometrical heights, the differences varying only from + 48 to − 34 feet. In the other four instances the discrepancies were larger, but this was probably owing to the fact of the weather having been on those occasions stormy or unsettled.

4. Hypsometers were tried on many occasions, but nearly always with discordant and unsatisfactory results. Out of thirteen comparisons of hypsometric heights with those found by the Gay-Lussac and vertical angles, in two only was there close agreement. In the remainder the hypsometric values varied from 54 to 133 feet below, and from 184 to 383 feet above, the true altitudes. They differed in the most irregular and unaccountable manner, and no weight has been attached to them.

It will have been seen from the foregoing description that the opportunities this survey afforded of testing the values of aneroids and hypsometers for determining altitudes have been more than usually numerous and favourable. The instruments were by the best makers, and good of their kind; there was a fair supply of them; they were used in a systematic manner, and tried over a considerable range of heights. The series of results is very numerous, and perhaps more comprehensive in its character than any yet given to the public. The conclusions to be drawn from them, cannot but be valuable. These conclusions appear to be—(1) that at high altitudes hypsometers are not to be depended on for any but the roughest approximations; (2) that aneroids are, *per se*, almost worthless for absolute determinations, and are only of service when used, as at Sinai, in direct connection with standard mercurial barometers at various heights, or for filling in details of a survey between datum-points of known altitude. If it had not been for the data at Feirán and Jebel Músá afforded by the Gay-Lussac, the sliding-scales of index error could never have been hit upon, and the correct reduction of the aneroid readings would have been hopeless; and, as it was, the index errors of five aneroids out of eight could not be depended on, when they were carried to any great height above the highest Gay-Lussac datum in Wády ed Deir. It is difficult to say whether, if taken independently—that is, without the incidental help of the Gay-Lussac—the aneroid heights would have been more or less trustworthy on the whole, than those given by the hypsometers. But there can be no doubt that our best determinations are those of the two permanent camps and of the trigonometrical points in and about the special surveys.

X.—*Recent Elevations of the Earth's Surface in the Northern Circumpolar Regions.* By HENRY H. HOWORTH.

AMONG the phrases we owe to the ancients, there are few we use more frequently than that of *terra firma;* and among the prejudices common to untutored man there are few more justifiable perhaps than that of the stability of the solid earth when compared with the mobility and restlessness of the water. Yet at a very early date the inhabitants of some areas of the world must have been impressed that there were considerable exceptions to the rule, that in the neighbourhood of Etna and Vesu-

* The highest point where aneroid observations were made is about 8,526 feet above the sea.

vius and Santorin there were causes operating that played tricks with the solid ground as the wind plays with the waves, and in fact we know that from the days of Homer these impressive facts were known and appreciated. It was reserved for modern times, however, to greatly extend the notion, and for the geologists and physical geographers, of this century especially, to prove that there were many areas far removed from the palpable signs of recent disturbance that exist in Southern Italy and in other volcanic regions which were undergoing movements, some of a rapid, others of a very slow, character. Sir Charles Lyell has especially aided in this work. But notwithstanding such investigations, the whole subject has been but little studied. The maps of the world which show according to the latest researches the areas of upheaval and subsidence, such as those contained in M. Reclus's book and in Murray's 'Distribution of Mammals,' are not only full of blunders, but they show how empirically the subject has been approached. These areas are, in a great measure, scattered with little order about the earth's surface, like plums in a cake, and are treated as purely local. I have long felt that this was unsatisfactory, and with very great deference venture to offer some matter which I hope will aid in further solving this problem. The general result of my researches is that the phrase, like so many other phrases in constant use, does not represent any fact in nature. I hope to prove, as far as materials allow, what has been often *theoretically* held, that every portion of the so-called solid earth is moving, swelling here and sinking there; that the chief difference in the mobility of sea and land is one of degree only and relative; and further that the areas of elevation are perfectly continuous and arranged in such an order that some very important problems in terrestrial physics seem explainable when read in connection with them. Especially does this distribution throw light on the theory of earthquakes and volcanoes. Before entering upon the details of the subject, I would say a few words to point out its very great importance both to theoretical science and to practical problems of daily life, which may bespeak for it your sympathy and perhaps more active assistance. To the physical geographer, who has to deal with the distribution of land and sea and the general orography of the earth, it is needless to suggest the interest of the problem. Geologists who have been so eloquently taught by Lyell and others, that if they are to know the former history of the earth they must examine the causes operating now, and whose special province it is to study the successive layers of marine and terrestrial deposits which embalm the world's history, need not be told that the solution of this problem is absolutely necessary to the most elementary

knowledge of the deeper laws of the earth's change. In ethnology (my own subject) it was the difficulty, if not the impossibility of understanding the migrations of certain tribes, such as the Esquimaux, &c., without postulating some important changes in the distribution of land and water, that first made me study this subject, and so I might go on with the other sciences. Now for practical problems, those dear to modern Philistinism. In making canals, especially such canals as the Suez and that across the Isthmus of Darien, it is surely very necessary to inquire whether the land is rising or sinking; the same in choosing sites for harbours; the same also in laying cables across sea bottoms which may be cracking and sinking in a dangerous manner; and so I might proceed, but I have said enough to show the very great interest and importance of the problem. This being so, it does seem very strange that so little has been done towards its solution; that while diligent astronomers have been eagerly examining the moon's surface to try and detect some change in progress there, no systematic examination of the earth has been made in the same direction. The following is necessarily a very crude and miserable beginning only. It is beyond the power of one individual to do the work properly. It requires the assistance and perseverance of many students in many parts of the world, and if I succeed in interesting other students in the work and gaining their co-operation, if I could above all persuade the department over which Admiral Richards presides with so much skill and so wide a reputation to undertake the collection of some facts, I should be more than repaid. I have preferred to quote the various authorities in their own words. In some cases the evidence has perhaps been misread. It is not always easy to distinguish the silting up of an estuary from the rise of the land, but I believe the majority of the instances quoted are reliable. It is no small credit to the Geographical Society to find the extent to which we are indebted to it for our facts.

I shall begin with the northern hemisphere, and first trace out the area of upheaval. Greenland is a good point to start with. It is well known that Greenland is subject to a movement of oscillation, the northern portion of it being in process of elevation, and the southern of depression, the axis of the movement being variously placed between the parallels of 74 and 77. I will quote a passage from Dr. Kane's travels: "The opportunity I had to-day of comparing the terrace and boulder lines of Mary River and Charlotte Wood Fiord enables me to assert positively the interesting fact of a secular elevation of the crust commencing at some as yet undetermined point north of 76°, and continuing to the great glacier

and the high northern latitudes of Grinnell land. This elevation is connected with the equally well-sustained depression of the Greenland coast south of Kingutak." * Again: "The depression of the Greenland coast which I had detected as far north as Upernavik is also going on here (*i.e.*, the Crimson Cliffs). Some of the Esquimaux huts were washed by the sea or torn away by the ice that had descended with the tides. The turf too, a representation of very ancient growth, was cut off even with the water's edge, giving sections 2 feet thick. I had noticed before such unmistakable evidence of the depression of this coast. *Its converse elevation I had observed to the north of Wolstenholme Sound.* The axis of oscillation must be somewhere in the neighbourhood of latitude 77°." † M'Clintock says: "It has been abundantly proved by the existence of raised beaches and fossils that the shores of Smith's Sound have been elevated within a comparatively recent period." He then goes on to show that this elevation has probably ceased in the very latest times, and concludes at Upernavik the land has sunk, as is plainly shown by similar ruins, over which the tides now flow." ‡

Crossing Baffin's Bay to the American coast, we have little difficulty in proving that the axial line previously spoken of extends into that continent. Thus, in regard to Labrador: "From all the indications noticed casually by us, such as the portion of beaches apparently very recently raised above the sea level, so as to be just beyond the reach of the waves, the land is slowly gaining on the sea. The Reverend C. C. Campbell, minister at Caribou Islands, in the Straits of Belle Isle, also informs me that this is his impression, gained both from his observations and information given by the settlers. To this last source Mr. J. F. Campbell is indebted for the statement in his 'Frost and Fire' that the Coast of Labrador is slowly rising." § In Chimmo's account of his visit to the north-east coast of Labrador, he mentions many reefs, &c., not marked on the maps. ‖ These were probably, therefore, recent elevations.

In regard to Newfoundland Mr. Moreton says "that there is much bare protruding rock in all parts of the island presenting everywhere a rounded, worn, and water-washed appearance, such as can only be produced by their having once been part of the ocean-bed. Large boulders of stone of different character from all the rock around are lodged in all parts. Some of the most remarkable are on the highest lands. A recent, and I suppose

* Vol. ii. p. 80. † Op. cit. p. 277. See also 'The Open Polar Sea,' p. 402.
‡ 'M'Clintock's Journal,' pp. 76, 77.
§ Packard's 'Glacial Phenomena of Labrador,' &c., 'Memoirs of Boston Nat. Hist. Society,' vol. i. part 2, p. 229.
‖ 'Journal of the Royal Geographical Society,' vol. xxxviii. p. 258.

still proceeding, uprising of the whole island from the sea is very observable, and many proofs of it have been brought to my notice. For instance, a narrow tickle at the head of Greenspond Harbour, in which the water now is scarcely deep enough for a punt passing, was in the memory of aged people sufficient for the passage of large fishing-boats called shallops. At Purchard's or Pilchard's Island and in Twilling-gate Harbour, rocks now above water are remembered as formerly sunken rocks, over which it was possible and usual to row small boats. In many places, from the same causes, the fishermen cannot now let their boats ride in the same water where their fathers were wont to moor them. I have been told of similar changes in Trinity Harbour."* Going somewhat further south, Mr. Hopkins says: "Two hundred and fifty years ago Sir Francis Drake sailed into Albemarle Sound through Roanoke Inlet, which is now a sandbank above the reach of the highest tide; only seventy years ago it was navigable by vessels drawing 12 feet of water."†

It is clear, however, from Lyell's observations,‡ that we are here on the borders of an area of subsidence which extends along the United States coast as far south as Florida, an area which I shall describe more particularly in a future paper. I will now adduce the facts which make it clear that the elevatory movement is shared by the whole arctic border-land of America.

In Franklin's voyage in 1819, 1820, and 1821, he mentions having found much drift wood in the estuary of the Copper Mine River. He also picked up "some decayed wood far out of reach of the water." He adds that the Copper Mine River itself brings down no drift wood.§ In his second voyage along the Arctic Sea he describes the coast from the Mackenzie River to the Rocky Mountains as very shallow and full of shoals and reefs. Inside some of the latter was brackish water, as was also the water in pools at some distance inland; piles of wood were also thrown up far from the coast. ‖ While Franklin surveyed the coast westward, Dr. Richardson did the same to the east. The latter says: "On the coast from Cape Lion to Point Keats there is a line of large drift timber, *evidently thrown* up by the waves, about 12 feet in perpendicular height above the ordinary tides." He shortly afterwards mentions that in the Polar Sea when cumbered with ice such waves are impossible, and as his journey was in the hot season, and the sea was then crowded with hummocks, the inference that the drift wood was thrown up by the waves is inadmissible, and the line of drift wood 12 feet above the sea level is only a

* 'Journal of the Royal Geographical Society,' vol. xxxiv. pp. 264-5.
† 'World before the Deluge,' p. 22.
‡ 'Principles of Geology,' 11th edition, vol. i. p. 563.
§ 'Narrative,' p. 357. ‖ Ibid., p. 134.

parallel to the numerous other cases. The vast sheet of shallow and brackish water, 140 miles long and 150 broad, which is separated from the Polar Sea by low banks and spits of sand, and is called by Dr. Richardson Esquimaux Lake, formed, there can be little doubt, very recently, as that traveller suggested, a bay of the Polar Sea, and is an example of the creation of huge brackish lakes by a sea which is constantly contracting, such as are familiar in the eastern borders of the Caspian. "M'Clure found shells of *Cyprina islandica* at the summit of the Coxcomb Range, in Baring Island, at an elevation of 800 feet above the sea level. Captain Parry has also recorded occurrences of Venus (probably *Cyprina islandica*) in Byam Martin Island, and in the recent voyage of the *Fox*, the surgeon found the following sub-fossil shells at Port Kennedy, at elevations of 100 feet to 500 feet:—*Saxicava rugosa, Tellina proxima, Astarte arctica* (*borealis*), *Mya Uddevallensis, Mya truncata, Cardium*, sp. *Buccinum undatum, Acmea testudinalis*, and *Balanus Uddevallensis*." *

Speaking of the eastern part of Melville Island, Parry says: "One of the *Hecla*'s men brought to the boat a narwhal's horn, which he found on a hill more than a mile from the sea, and which must have been carried there by the Esquimaux or by bears (!!) . . . . Sergeant Martin and Captain Sabine's servant brought down to the beach several pieces of fir-tree which they found nearly buried in the sand at the distance of 300 or 400 yards from the present high-water mark, and not less than 30 feet above the sea level. We found no indication of this part of the island having been inhabited unless the narwhal's horn above alluded to be considered as such.† Again, speaking of the northern part of Melville Island, near Point Nias, two pieces of drift wood were also found on the beach 10 or 20 feet above the present level of the sea, both of pine, one 7½ feet long and 3 inches in diameter, and the other much smaller. Both were partly buried in sand and their fibres so decayed as to fall to pieces on being laid hold of.‡ Again, speaking of the west of Melville island: "The land gains upon the sea, as it is called, in process of time, as it has certainly done here from the situation in which we found the drift wood and the skeletons of whales.§

King William Island is rather low, the western shore extremely so, and bears evidence of a gradual and tolerably recent upheaval from beneath the sea.‖ These extracts from the Arctic voyages might be extended, but they will suffice to show what is generally recognised, that the archipelago north of the

* 'Appendix to M'Clintock's Narrative.'
† 'Parry's Voyage in 1819–20,' p. 68. ‡ Ibid., p. 193. § Ibid., p. 235.
‖ M'Clintock in 'Journal of the Royal Geographical Society,' vol. xxx. p. 10.

American continent shows, wherever examined, signs of current elevation. We may now continue our survey along its western coast.

So long ago as 1778, Captain Cook makes the following remark about the coast of Behring's Straits, near Cape Denbigh:—"After breakfast a party of men were sent to the peninsula for brooms and spruce. . . . . It appeared to me that this peninsula must have been an island in remote times, for there were marks of the sea having flowed over the isthmus. And even now, it appeared to be kept out by a bank of sand, stones, and wood thrown up by the waves. By this bank it was evident that the land was here encroaching upon the sea, and it was easy to trace its gradual formation."*

In describing the journey of Captain Krenitzin and Lieutenant Levashef in 1768–69, Coxe says: "The *St. Catherine* wintered in the Strait of Alasca, and was drawn into shoal water. The instructions set forth that a private ship had in 1762 found there a commodious haven, but the captain looked for it in vain. . . . . On surveying this strait and the coast of Alasca many craters were observed in the low grounds close to the shore, and the soil produced few plants. May not this allow the conjecture that the coast had undergone considerable changes, even since the year 1762?"†

In Whymper's account of his journey to Alaska, I find the following passage:—"The island of St. Michael's is covered with moss and berries, resting sometimes on a bed of clay, but more commonly on a porous lava rock. The formation apparently extends to the Youkon. The Indians have a tradition that the island was upheaved from the sea, an occurrence at least possible. A large rock in the chain of the Aleutian Islands, known to the Russians as the Bajaslov Volcano, rose from the sea in 1796. Zagoskin says: "That the spot where the fort (*i.e.*, Fort Youkon) now stands has been covered by the sea within the memory of the Indians living at the date of his visit in 1842 and 1843." Again: "The entire country is sprinkled over with remains of Pliocene Mammals, *Elephas?*, *Ovibos moschatus*, &c. Beds of marl near Fort Youkon contain fresh-water shells still living in the vicinity."‡ Mr. Grant tells us that in Vancouver's Island a raised sea-beach with scanty sandy soil is mentioned as extending with a breadth of from 300 to 500 yards all along the north-east end of the harbour of Port St. Juan.§

* 'Cook's Voyages,' edition of 1842, vol. ii. p. 344.
† 'Coxe's Russian Discoveries,' p. 251.
‡ 'Journal of the Royal Geographical Society,' vol. xxxviii.
§ Ibid., vol. xxvii. p. 285.

In a paper on the Beaches of British Columbia, by Mr. Begbie, I find the following paragraph:—"Changes of level are now going on in a gradual way in some parts of the colony. At a point near Frazer River, 13 miles south of Quesnelle, and again on that creek an affluent of Bonaparte River, I have noticed beaver-dams on a slant, abandoned dams, of course. A beaver-dam is never known to give way, never built on a stream that runs dry in summer, and is, of course, as level as the surface of the water it is meant to retain. There had been no violent commotion, for the dams were all quite perfect. No water was now running there. The old watercourse still visible and many cotton-trees still growing, perhaps 30 years old, but no signs of living beavers."*

To prove that this movement of the northern coasts of America is shared by the interior of the country, we must examine the great series of lakes that form such a notable feature in the physical geography of that continent.

Captain Back says that the country from the Great Slave Lake to the Polar Sea is strewn with boulders, &c., and is evidently not long reclaimed from the sea.†

The country forming the Hudson's Bay Territory is covered with erratic boulders, and many patches of pleistocene deposits, containing marine shells of the present Arctic species (*Mya truncata, Saxicava rugosa*, &c.) The whole country is too flat for these boulders to have been the débris of glaciers. They were most probably left by floating ice and icebergs when the land was submerged. The cliffs of Lake Winnipeg contain fresh-water shells still living in the lower waters, such as *Unio, Helix, Pupa*, &c., often raised more than 100 feet above the present levels of the streams, and appear to be ancient lake or river terraces, leading to the belief that the existing series of lakes from the St. Lawrence northward were once united in one or more vast fresh-water seas. A subsidence of 400 feet would make Lake Ontario discharge its waters by the Mohawk and Hudson into the Atlantic, convert Lake Champlain into a maritime strait, and form islands of the States of New York, New England, and Maine, New Brunswick, and Nova Scotia; a subsidence of one-fourth of this would carry the waters of the Missouri and the upper Churchill and Mackenzie rivers into Lake Winnipeg, and convert the plain country bordering the Rocky Mountains into an inland sea. The raised beaches of Lake Superior are 100 feet above the present level.‡

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* 'Journal of the Royal Geographical Society,' vol. v. p. 132.

† Ibid., vol. vi. p. 1.

‡ Isbister's 'Geology of Hudson's Bay Territory,' 'Journal of the Royal Geographical Society,' vol. xi. p. 497.

"On Lake Superior in Canada deposits face the lake in the shape of bare earth-banks and terraces. They are all the produce of the lake when standing at a higher level. . . . . On Lake Huron are successive belts of water-worn erratics of large size, one above another, with a few yards interval between each. On the summit of a cliff 100 feet high, Colonel Delafield informs me there is a range of water-worn stones regularly strewn as on a beach for 200 feet in length. These instances of remains of ancient deposits might be greatly multiplied, as they are very usual in this lake when the vegetation permits them to be seen." I have extracted this passage from a very interesting paper by Mr. Bigsby on Canadian Erratics, in the seventh volume of the 'Geological Journal,' which describes similar traces as existing in nearly all the lakes of North America. His *résumé* of the evidence states that "the Canadas, in common with all the western and northern parts of the United States, are mapped out by irregular concentric rings of terraces and ridges, sometimes hundreds of miles in circuit, which enclose the beds (with or without water) of lakes and ponds more or less closely. The mouths of rivers here and there break through these rings, and the rivers themselves are also bordered with terraces. . . . . The terraces are the margins of former bodies of water much loftier and larger than those now existing. These ancient lakes have been more or less emptied by the elevation of their beds, an elevation taking place perhaps very extensively, slowly, and variously." *

Having shown by the evidence of the lakes and rivers (those gauges of level by which alone we can test the change of level that is progressing in a country) that the interior of the northern part of the American continent is rising as well as the coast, we will now pass on to an examination of the remaining half of the northern circumpolar regions comprised in Europe and Asia.

The remarkable changes that have taken place in Scandinavia, in illustration of our subject, are among the elementary facts of geology. They have given rise to an extensive literature, somewhat fierce in its controversial bitterness. The question has been complicated by a difficulty which arises in many other districts, namely, that we seem to have arrived at a critical turning-point in the world's history, where areas which have long been rising have become quiescent or even begun to sink again. I cannot enter into the details of the Scandinavian controversy which have been collected by Sir Charles Lyell, in his Bakerian Lecture on this subject and elsewhere, but will content myself with quoting the more striking authorities, with

* Op. cit. p. 236.

whom I agree. Early in the last century Celsius expressed his opinion that the waters both of the Baltic and Northern Ocean were gradually subsiding, and from numerous observations inferred that the rate of depression was about 40 Swedish inches in a century. In support of this position he alleged that there were many rocks both on the shores of the Baltic and of the Ocean known to have been once sunken reefs and dangerous to navigators, but which were in his time above water; that the Gulf of Bothnia had been gradually converted into land, several ancient ports having been changed into inland cities, small islands joined to the continent, and old fishing-grounds deserted as being too shallow or entirely dried up. He also maintained that in the time of the ancients Scandinavia was what they described it to be, namely, an island, and that it became a peninsula some time between the days of Pliny and the ninth century.* This view was opposed by several writers. Playfair, in 1802, accepted the views of Celsius, and argued that the change was due to the rise of the land. In 1807 Von Buch, after returning from a tour in Scandinavia, announced his conviction that the whole country from Frederickshall in Norway to Abo in Finland, and perhaps as far as St. Petersburg, was slowly and insensibly rising. He was led to these conclusions principally by information obtained from the inhabitants and pilots, and in part by the occurrence of marine shells of recent species which he had found at several points on the coasts of Norway above the level of the sea. He also mentions the marks set on the rocks.† These discoveries induced several Swedish philosophers to have certain rocks grooved at the level of the water in calm weather, with the date of each added. In 1820 and 1821 the marks were examined by the officers of the pilotage service, who reported to the Royal Academy of Stockholm. From this Report it appeared that along the whole coast of the northern part of the Gulf of Bothnia the water was lower than formerly. New marks were at the same time made. In 1834 Sir Charles Lyell made an elaborate survey of the district, and published the result as the 'Bakerian Lecture' in the 'Philosophical Transactions' for 1835. He reports that, in the interval between 1821 and 1834, the land appeared to have risen in certain places north of Stockholm 4 or 5 inches, and he convinced himself during his visit to Sweden, after conversing with many civil engineers, pilots, and fishermen, and after examining some of the ancient marks, that the evidence formerly adduced in favour of the change of level, both on the

* Lyell's 'Principles of Geology,' 9th edition, p. 520.
† Trans. of 'Buch's Travels,' 387, quoted in Lyell, op. cit.

coasts of Sweden and Finland, was full and satisfactory. *Inter alia* he mentions rocks and boulders strewn over the shoals, which have been observed to increase in height and dimensions within the previous half-century. Some formerly known as dangerous sunken rocks are now only hidden when the water is the highest. Similar points have grown to long reefs, while others have been changed from a reef annually submerged to a small islet on which a few lichens, a fir-seedling, and a few blades of grass attest that the shoal has at length been fairly changed into dry land. Long fiords and narrow channels, once separating wooded islands, have been deserted by the sea within the memory of living witnesses on several parts of the coast. It is well known that the southern extremity of Scania is sinking; the proofs will be collected in another paper. On the eastern or Baltic side of Sweden Sir Charles Lyell found the first unmistakable evidence of rising at Calmar, in 56° 41′ N. lat. The foundations of the castle there, which had originally been subaqeuous, were found to have risen 4 feet in four centuries. At Stockholm there were found striking proofs of change since the Baltic acquired its present tenants—Testacea, found there 70 feet above the sea-level, being identical with those now found in the adjacent sea at Sodertelji. A little further south, strata of sand, clay, and marl, more than 100 feet high, and containing shells of species now inhabiting the Bothnian Gulf, were found. The three lakes of Husar, Ladu, and Uggel, which formerly (temp. Charles IX.) constituted the Gulf of Fiskartorp, had grown much shallower, and in part become dry land. At Upsala, 40 miles N.N.W. of Stockholm, brackish-water plants were found in meadows where there are no salt-springs; proof that the sea has recently retired. The Marsh at Oregrud, 40 miles north of Upsala, had risen 5½ inches in the interval since 1820. At Gefle, 40 miles to the N.W., are low pastures, where the inhabitants' fathers remembered boats and even ships floating. At Pitea, in the Bothnian Gulf, the land had gained a mile in 45 years; at Lulea, a mile in 28 years; and at Tornea it was advancing rapidly, according to M. Reclus,* at the rate of 5 feet 3 inches in a century.

These facts, which might be multiplied, suffice to show that the Baltic coast of Sweden, north of about the 56th parallel, has been recently rising from the sea.

M. Reclus argues that the Baltic communicated but recently with the North Sea by a wide channel, the deepest depressions of which are now occupied by the Lakes Mälar, Hjelmar, and Wener, considerable heaps of oyster-shells being found in

* 'The Earth,' vol. ii. p. 622.

several places on the heights commanding these lakes. Similar beds are found round the Gulf of Bothnia.* From Baer's researches it would seem that oysters cannot live and grow in water holding more than 37 parts in a thousand of salt, or less than 16 or 17 in a thousand. The waters of the Baltic now do not contain more than 5 parts in a thousand, and yet the beds of oysters prove that both the Baltic and the inland lakes were once as salt as the North Sea. M. Reclus argues this saltness could only come from some former strait which occupied the depressions in which the Swedish engineers have dug out the Trolhatta Canal. Besides, he says, when the sluices were being constructed, there were found not far from the cataracts, and at a height of 40 feet above the Cattegat, various marine remains mingled with relics of human industry, boats, anchors, and piles.† Sir Charles Lyell says similar oyster-beds have been found further inland on the borders of Lake Wener, 50 miles from the sea, at an elevation of 200 feet near Lake Rogvarpen. Similar beds have also been discovered on the southern shores of Lake Mälar, at a place 70 miles from the sea.‡ So that we may take it as proved that the great Swedish lakes are the remains of a very recent marine strait, separating Scania from the mainland. The shores of the Cattegat afford ample evidence of upheaval.

The greater part of Denmark is either stationary or sinking, but, according to Forchhammer, the terminal point of Jutland, bounded by an ideal line tending obliquely from Fredericshavn towards the north-west, rises 11·70 inches in a century. *The amount* is here probably exaggerated.

We will now turn to the coast of Norway. Here we approach evidently a boundary-line between rising and sinking land. "Professor Keilhau, of Christiania," says Sir Charles Lyell, "after collecting the observations of his predecessors respecting former changes of level in Norway and combining them with his own, has made the fact of a general change of level at some unknown, but, geologically speaking, modern period (that is, within the period of the actual testaceous fauna) very evident. He infers that the whole country from Cape Lindernas to the North Cape, and beyond that as far as the fortress of Vardhuns, has been gradually upraised, and on the south-east coast the elevation has amounted to more than 600 feet." The same author tells us that marine fossil shells of recent species have been collected from inland places near Drontheim. On the other side Mr.

* These beds of shells have since been traced by Erdmann to Sinde, at the head of a lake of that name, 130 miles west of Stockholm, at the height of 230 feet above the sea.

† Reclus, op. cit. vol. ii.

‡ Lyell, op. cit. 527–9.

Everest has shown that the island of Munkholm, an insulated rock in the harbour of Drontheim, has remained nearly stationary for eight centuries. Brongniart and Sir Charles Lyell both found beds of recent shells raised 200 feet above the sea at Capellbacken, all the species being identical with those now inhabiting the contiguous ocean. The former also found balani adhering to the rocks above the shelly deposit, showing that the sea had remained there a long time. This was verified by Lyell in 1834, at Kured, about 2 miles north of Uddevalla, at a height of more than 100 feet above the sea. He says these barnacles adhered so firmly to the gneiss, that he broke off portions of the rocks, with the shells attached. Similar deposits of shells are found at the island of Orust, opposite Uddevalla. Between Gothenburg and Uddevalla, and on the islands of Marstrand and Gulholmen similar proofs may be studied,* proving that we are here on the borders of a doubtful line.

In 1844 M. Bravais showed that in the Gulf of Alten, in Finmark, the most northern part of Norway lying to the north of Lapland, there are two distinct lines of upraised ancient sea coast, one above the other.†

From Finmark we may naturally step across to Spitzbergen, an island which is notoriously rising from the sea at a rapid rate. I find the following passage as early as 1646:—These mountains (twenty-two mountains of Spitzbergen) increase in bulk every year, so as to be plainly discoverable by those that pass that way. Leonin was not a little surprised to discover upon one of these hills, about a league from the seaside, a small mast of a ship, with one of its pulleys still fastened to it. This made him ask the seamen how that mast came there, who told him they were not able to tell, but were sure they had seen it as long as they had used that coast. Perhaps formerly the sea might either cover or come near their mountain, where some ship or other being stranded, this mast is some remnant of that wreck.‡ Parry, in an account of his journey towards the Pole, page 126, refers to the vast quantities of drift-wood stranded on the Spitzbergen coast above high-water mark.

In the 16th volume of the 'Transactions of the Geological Society,' Mr. Lamont tells us that he found great quantities of drift-wood on all the thousand islands, as well as on the south coast of the Spitzbergen main—some of it much worm-eaten, much of it lying at least 30 feet above high-water mark. He nowhere found any wood *in situ*. On all parts of Spitzbergen and its islands, visited by him, he found numerous bones of

* Lyell, op. cit. passim.
† Lyell, 'Principles,' 11th edition, 194.
‡ 'Account of Greenland,' by La Peyrère, in 'Churchill's Voyages,' vol. ii.

whales far inland and high above high-water mark. One large piece of a jawbone, found by himself in October 1859, was discovered 40 feet above the sea. It was part of an entire skeleton, which lay half buried in moss, about half a mile from the sea, in Walter Thymen's Straits. There was also a terrace of trap-rocks higher than the moss intervening between the latter and the sea. On one of the thousand islands he counted eleven very large jaw-bones, along with many bones forming other parts of the whale's skeleton, all lying close together in a slight depression, about 10 feet above the sea level. On the same island he saw what he took to be a further proof of the recent upheaval of the land. This was a sort of furrow or trench, 100 yards long by 3 or 4 feet deep, and 3 or 4 feet broad, ploughed up among the boulders, and presumed to be done by icebergs. It was on a gentle slope, about 20 feet above the sea, and extended from north-east to south-west, exactly the run of the current ice at the present day.*

The German expedition of 1869 also found heaps of drift-wood 20 feet high above high-water mark on the south-east shore of Spitzbergen. The seal fishers told Mr. Lamont that the land was rising, and that the Right whale had forsaken the Spitzbergen seas, which had become too shallow for it.

East of Nova Zembla Captain Mack, who made a journey there in 1871, found the barren and sandy islands known as the Gulf Stream islands. In the spot where these now are, the Dutch, in 1594, found and measured a sandbank in soundings of 18 fathoms, showing an upheaval here of 100 feet in 300 years. In the same year Captain Nils Johnson landed in the country called Wiche Land in the map of 1617, situated about 30° east longitude and 78° north longitude. He says that the shores there, to a distance of 100 miles inland, and to a height of about 20 feet above high-water mark, are covered with drift-wood.†

We may now return to the mainland of Europe, and continue our survey eastwards.

Pennant long ago observed that the White Sea and the Baltic were but recently joined together by a strait. He says the lakes Sig, Onda, and Wigo form successive links from the lake Onega to the White Sea. The Lake Siama almost cuts Finland through from North to South. Its northern end is not remote from Lake Onda, and the southern extends very near to the Gulf of Finland, a space of nearly 40 Swedish, or 260 English miles. These were probably part of the bed of the ancient Streights (*sic*) which joined the White and Baltic Seas.‡ Great

* 'Journal of the Geological Society,' vol. xvi. p. 428.
† 'Ocean Highways,' pp. 247 and 292.
‡ 'Appendix to Arctic Zoology,' p. 23.

portions of Finland, which is known to the natives as Suomenia, or the land of swamp, has all the character of a recently-emerged land. It is sprinkled over with lakes separated by flats of sand covered with moss. The level of some of these lakes is rapidly falling, which means that the land is rising. We are told this especially of the River Vosca and the Lake Samia, of which it is the only feeder. In the spring of 1818, Lake Souvando, on the west of Lake Ladoga, broke down the isthmus that separated it; its waters were lowered 5026 fathoms, and much land was left dry.

Sir Charles Lyell tells us, that on the coast of Finland, as on that of Sweden, the fishermen have traditions that what is now dry land was in their fathers' days water. The surface of Finland generally is covered with traces of a prodigious diluvial revolution in recent times.

MM. de Keyserling, Murchison, and de Verneuil have found at points 250 miles to the south of the White Sea, on the banks of the Dwina and the Vaga, beds of sand and mud containing several kinds of shells similar to those which inhabit the neighbouring seas, and so well preserved that they had not lost their colours.*

In some Notes on the Ice between Greenland and Nova Zembla, by Captain Jansen,† he says, quoting an experienced navigator called Thenius Ys: "Drift-wood, though there is plenty on the beach, is found far above this mark, and so remarkably high, that I do not understand how it is brought there." Again, speaking of Captain Wm. de Vlaningh, who sailed along the north and north-east coasts of Nova Zembla in 1664: At a considerable height he found on a rock on the smallest of the three Islands of Orange a very large tree that three or four men could not lift. This tree was rotten. The tree lay much too high to have been brought there by water, perhaps by a water-spout he says.

The two islands of Nova Zembla are each divided from north to south by a prolongation of the Ural Mountains, but they consist chiefly of a marshy moss-clad plain. It has lately been found that there are saline lakes in these islands.‡

M. de Middendorf states that the ground of the Siberian tundras is in a great part covered with a thin coating of sand and fine clay, exactly similar to that which is now deposited on the shores of the Frozen Ocean. In this clay, too, which contains in such large quantities the buried remains of mammoths, there are

* Reclus, op. cit. vol. ii. p. 627.
† 'Proceedings of the Royal Geographical Society,' vol. ix. p. 163.
‡ Maltebrun: Geog., vol. ii. p. 394.

also found heaps of shells perfectly identical with those of the adjacent ocean. Far inland, besides, traces of drift-wood are seen, the trees which once grew in the forests of Southern Siberia: these trees, having been first carried into the sea by the current of the rivers, have been thrown up by the waves on the former coast, which are now deserted by the sea.* Our chief authority for the shores of the Arctic Sea is Von Wrangel, and from his travels I shall quote freely:—"In 1810, Hedenstrom went across the Tundra direct to Utsjansk. He says, on the Tundra, equally remote from the present line of trees, among the steep sandy banks of the lakes and rivers are found large birch-trees, complete with bark, branches, and roots. At first sight they appear well preserved, but on digging them up they are found to be in a thorough state of decay. On being lighted they glow, but never burst into flame; the inhabitants use them for fuel; they call them Adamoushina, or, of Adam's time. The first living birch-tree is not now found nearer than three degrees to the south, and then only as shrubs." Again, in 1811, Samukof reports that he found the skulls and bones of various animals in the interior of Kotelnoi Island, and that both there and in New Siberia he found large trees partially fossilized. These islands have apparently all been recently submerged, for it is reported that the greatest stores of mammoth ivory are now got from the sand-banks which are constantly appearing near the Bear Islands; the barren surface of the latter, a conglomerate of bones, stones, and ice, has all the character of a recently recovered sea bottom. Wrangel tells us, that ribs of whales are often found on the west coast, and that whales are now very seldom seen on the Siberian coast, while in the 18th century their appearance there was much more frequent. The only cause for this desertion that I can suggest is that assigned by the Spitzbergen fishermen, namely, that the sea is becoming too shallow for the whale. "The shores of the Polar Sea, from the Lena to Behring's Straits, are for the most part low and flat. In winter it is hard to say where land ends and sea begins. A few versts inland, however, a line of high ground *runs parallel with the present coast*, and formerly no doubt constituted the boundary of the ocean. This belief is strengthened by the quantity of drift-wood found on the upper level, and also by the shoals that run far out to sea, and will no doubt become dry land.† Again: "At several places along the coast we found old weathered drift-wood at the height of two fathoms above the present level of the sea, while the fresh drift-wood lay on a lower level. *This indi-*

* Reclus, 'The Earth,' vol. ii. pp. 627, 628.
† Von Wrangel, Sabine's translation.

cates change of level." Again: "Captain Sarytschew says the winter dwellings erected by Laptef on the bank where his vessel was driven on shore lead to the belief that the channel must formerly have been on that side. At present there is no water there for a vessel of any size, and even a boat can only approach at high water. At low water the shoal runs 3 versts out to sea." * Diomed Island, described by Chalavrof in 1760, and by Laptef at a later date, no longer exists: it now forms a part of the main. The same voyagers describe the east coast of the Swatoi Moss as very sinuous: it is now very straight, the sinuosities having meanwhile disappeared. These facts will suffice to prove that so far as we have any evidence, the whole Siberian coast, as far as Behring's Straits, is rising from the sea.

In Mr. Grieves' translation of the 'History of Kamtchatka,' I find it stated, in the description of Behring's Island and the adjacent island, that, 30 fathoms higher than the sea-mark, lie wood and whole skeletons of sea animals which have been left by the sea.† He speaks of one of the rivers at Ochotsk as being now dry; this is probably caused by upheaval. And in describing the Penschinska Sea, he says he had seen "trees which are not to be found in the country hanging out of the earth, and more than 7 feet below the surface; whence (he says) it may be concluded that all these barren, boggy places, where at present there are no woods but shrubs and stunted sallows and birches, were once covered with water, which has decreased by degrees here, as it has on the north-eastern coast.‡

Quite recently Russian travellers have discovered on the coast of the great island of Saghalien heaps of modern shells, lying not far from the shore on beds of marine clay, and also former bays, which are now converted into lakes or salt-marshes. In like manner it has been proved that the regions of the Amur are gradually being upheaved, for, in order to maintain its level, the river has constantly to hollow out its bed between the cliffs, and on the plateau by the river-side semicircular sheets of water may still be seen, which are evidently former windings of the Amur.§

According to the accounts of the Chinese and Japanese chroniclers several volcanoes have risen from the bed of the sea on the coasts of Japan and Corea during the historical period. In the year 1007 a roar of thunder announced the appearance of the volcano of Toinmoura or Taulo, on the south of Corea,

* Von Wrangel, Sabine's translation, cvii. † Page 54.
‡ Ibid, pp. 59–61. § Reclus, vol. ii. p. 660.

and then, after seven days and seven nights of profound darkness, the mountain was seen. It was no less than 4 leagues in circumference, and towered up like a block of sulphur to a height of more than 1000 feet. More than this, the celebrated Fusi Yama itself, the highest mountain in Japan, is said to have been upheaved in a single night from the bosom of the sea 21½ centuries ago.*

I have alluded to the constant occurrence of dry beds of streams, which have all the appearance of having once been filled with water to a height of 6 to 10 feet above the present water-level, and which now in the rainy season are barely wet. I cannot help connecting this circumstance with precisely similar phenomena I have observed in the Bay of Shantung, on the opposite shore of the Gulf of Pecheli. I find also from the journal of an officer who travelled from Tientsin to Chefoo, that the same thing is noted in that quarter. So that the whole coast of the Gulf of Pecheli and Liautung, covering a space of over 200 miles from north to south, and nearly 300 from east to west, is cut up by dry beds of watercourses, many of them in the vicinity of mountains being strewn with smooth round pebbles. The two great alluvial plains, which for convenience I may call the valleys of the Peiho and the Liau-ho, present every appearance of having been recently under water. I say nothing of the tract of country extending from the Peiho southward and eastward to the mountainous coast of Shantung, not having myself visited this part. But the mud flat in the neighbourhood of Taku at the mouth of the Peiho, extending from the coast-line several miles inland to the limits of cultivated ground, and barely elevated above the sea-level, is barren and marshy, the water brackish, and the smooth surface, caked and cracked by the sun, is covered with a thin scurf of salt. These characteristics are, perhaps, more strongly marked in the northern valley, extending north and west from Newchang. . . . . The soil is barren, the surface caked, with only a little thinly-scattered coarse vegetation here and there, supporting a few horses and cattle. The margins of pools and watercourses are whitened with salt, and between Yingtze and the coast the whole surface has this white appearance in dry weather. In connection with this subject I would also mention that we were informed at Yingtze that the town of Newchang was in former times the seaport; that subsequently it had been abandoned for Taitze, a town some 20 miles nearer the mouth of the river, and that within the present century Taitze was in turn abandoned in consequence of the shoaling of the water, and Yingtze established

* Reclus, op. cit. vol. ii. p. 571.

as the seaport, as near the mouth of the river as soil could be found sufficiently firm to support buildings.*

Mr. Wylie, speaking at the Geographical Society in 1869, said: "It is asserted by the Chinese, and he believed it was confirmed by geologists, that the bed of the Gulf of Pecheli, with the adjoining coast-line (and the mainland, to what extent from the sea is not known), was gradually rising at the rate of 6 feet in a century." †

I owe the following to the courtesy of a correspondent, Mr. Rowland Hamilton:—"In 1860, when going in a house-boat from Ningpo to Shanghai, we were driven by stress of weather to a group of volcanic rocks, called the Rugged Islands. On one of these there was vegetation enough to support a small flock of goats, but the others were mostly barren. Around them the sea-bottom is rapidly silting up. On a sandy beach of the largest island there was a volcanic rock, composed, if I remember rightly, of scoriæ and ashes, of about the hardness of freestone, *some* 10 *to* 20 *feet above high-water mark, most clearly tide-worn.* I also remember climbing along a ridge of trap-rock, some 80 feet or so high, sloping at an angle of about 40° to the sea, the face of which was water-marked, though not so palpably. . . . . The hills about 16 miles from Shanghai have been a group of islands, though now entirely surrounded by cultivated alluvial soil instead of water."

I have now coasted round the shores of Europe and Asia to about the same latitude as that which limited our survey of the American continent, and found signs and proofs wherever we have any evidence that the elevation of the lands is shared by the coast-line of the older continents. I must conclude the inquiry with the evidence of the lakes, &c., of Central Asia, which prove that the movement of elevation is not confined to the coast, but extends far into the continent. The Abbé Huc tells us that, according to tradition, the Kokonoor Lake formerly covered the spot where Lhasa now is, and that one day it abandoned its former site for its present one.‡

In describing the country of the Chakar tribe of the bordered blue banner in Mongolia, the Chinese account, translated by Klaproth, says: "There was formerly in the territory of this banner a salt lake, into which the River Vore Shoria emptied itself. This lake was 30 li in length from east to west, and 20 li in breadth from north to south. At present neither lake nor river are to be seen.§

* 'Journey from Tientsin to Mukden,' by A. Michie, 'Journal of the Royal Geographical Society,' vol. xxxiii. p. 153.

† 'Proceedings of the Royal Geographical Society,' vol. xiv. p. 36.

‡ 'Huc's Travels.'

§ 'Timkowsky's Travels,' vol. ii. p. 262.

Pallas describes the plain surrounding the Sea of Baikal as formed of a low bed of flints, adding that this is a proof that the Baikal was formerly much higher than the present level.*

It was held by some of the Greek geographers, and notably by Strabo, that the Caspian communicated with the Northern Ocean by a strait, and there are traces everywhere in the intervening country of an immense desiccation which might favour such a notion. Thus Levchine, the historian of the Kirghiz Kazaks, writes, there are many bare sandhills to the north and north-east of the Aral, among which are salt-marshes and lakes. This seems to show the Aral has considerably diminished in bulk. This supposition is strengthened by the hills of Sary Boulak and Kouk Tornak, up to which the sea extended only forty years ago as the Kirghiz affirm. Now it is 60 versts off. These hillocks are bare of vegetation, and covered in places with shells and fish remains.

Further north we find that the lakes Aksakal Barbi in the middle of the last century formed only one basin over 200 versts in circumference, and reported to be deep.† The Russian engineers have shown of late years that it is shallow and very full of reeds. Pallas, the Baron Meyendorf, Pander, and Eversmann all agree that the south-west part of the Kirghiz Steppe is the dried bottom of some sea.

Levchine says, everywhere in the steppes are evidences of their having only recently risen from the sea. Most of the travellers here have noticed it; the proofs are—1st, the great number of salt lakes, salt-marshes, and salt and clay bogs; 2nd, the sea shells everywhere found; 3rd, the gradual shallowing of all the lakes; 4th, the salt taste of the rivers; 5th, ditto of plants and herbs; 6th, the encrustation of salt on all the plants; 7th, the undulating surface, evidently caused by waves. People worthy of credit assure us the space between the Lakes Avlia and the River Sara Tourgai must have once been under water. Lakes Naurzoum and Tchouksa are the deep pits of this reservoir. The edge of a plateau stretching from the River Tchiili to the mountains Koïçalmoura form its western bank or limit. On the east there is a similar plateau. Nearly all this stretch of land is sterile, chiefly covered with salt. The steppe "Mouss Bil," between Lake Aral and the Lakes Aksakal-Barbi, has the same character, it produces nothing, and shells are scattered everywhere.‡

Humboldt, in the 'Nouvelles Annales des Voyages' for 1830,

* 'Pallas's Travels,' vol. iv. p. 407. 'Isbister on the Geology of the Hudson's Bay Territory,' the 'Journal of the Royal Geographical Society,' vol. xi. p. 497.

† 'Rytchkof on the Topography of Orenburg,' in Levchine. ‡ Ibid. 33.

has the following remarks:—"Among the lakes are Balé Koul, 51° 30′ N. lat., and Koum Koul, 49° 45′ N. According to the ingenious hypothesis of M. Hense, the tract covered with lakes formed one vast reservoir, between which and the lakes Aral and Aksakal there was once a communication. This place resembles a vestige of the Deluge, going north beyond Omsk, between the Ichim to the Irtysch by the steppe of Barabine, which is full of lakes, further north beyond the Ob to Sourgout by the land of the Ostiacks of Beresof to the marshy borders of the Polar Sea. An ancient tradition, preserved by the Chinese, on the existence in the interior of Siberia of a great lake traversed by the Yenisei seems to point to this channel, whereby the waters of the Caspian and the Aral found their way to the Polar Sea.

What is true of the country north of the Aral is true also of that to the north-east. The vast sheet of water, called Lake Balkash, is bounded on the north-east by very extensive reedy marshes, these are doubtless the signs of the encroaching land. North-east of Lake Balkash are the two lakes Sacyk or Alaktu Koul and the Ala Koul. They were formerly probably joined together, the isthmus between them being very saline. The separation is probably recent, for the Chinese maps made by order of Kien Lung by the European missionaries figure only one lake. In the map of Ounkowsky, made in 1722 or 1723 from the reports of the Kalmuck chief, it is represented without the isthmus under the name of Alak Tougoul.*

If we now turn to the country east and south-east of the Aral, we find it occupied by the great sand wastes of Kara Kum and Kizil Kum, in some places threaded with the forsaken channels of rivers, and everywhere evidencing the tremendous desiccation that has taken place.

I have recently made a detailed examination of the question of the desiccation of a large portion of the frontier lands of Persia. From it I extract a short paragraph or two. The Aral Sea is bounded on the west by the plateau of Ust Urt. The scarped edge of that plateau is called the Tchink by the Kirghiz Kazaks. The Russian traveller Butakoff says: "On some of the cliffs of the Ust Urt and the Isle Nicholas are evidences of the action of water on heights to which the waves of our days cannot attain in the most violent storms." The southern shores of the Aral are low and flat, and we are not surprised to find in maps, &c., that there are traces of its having extended much more to the south and south-west in recent times, and in fact the evidence is overwhelming that in the

* Levchine, op. cit.

days of the Greek geographers the Caspian and the Aral were one sea. Pliny, who relates circumstantially the route of Indian commerce down the Oxus into the Hyrcanian Sea, and across that to the mouth of the Cyrus or Kur; Strabo, who gives a similar account; and Patrocles, who seems to have navigated the sea itself, could hardly have invented the tale, and the dried channels, shrinking salt-lakes and other débris of a recent sea which strew the terrible Turkoman desert between the Tchink and the frontiers of Khorasan, are to my mind indisputable traces of the strait recently connecting the two seas; while we have abundant evidence of pilots, &c., that the land has been gaining very largely on the sea along the eastern shore of the Caspian. That the waters of the Caspian are receding is a very familiar fact, a comparison of Woodroof's map attached to Hanway's travels which contains elaborate soundings, &c., with recent maps is very instructive on this point. The huge Gulf of Balkanskoi, which is carefully traced and sounded in Woodroof's map, and there contained three or four islands, no longer exists, but is replaced by two small inlets, and two at least of the islands are now joined to the mainland. The sea at the former date washed the foot of the Little Balkan. It is now 30 miles from it, the intervening space being occupied, as described by Vámbéry, who trespassed upon it, with dangerous salt morasses covered with a thick white crust. This salt crust is a marked feature of the low shore of the Caspian. Places formerly covered with 5 to 8 feet of water are now dry. Lieutenant Wood was told at Asterabad that the Caspian had retired very considerably during the previous hundred years, and Woodroof was told that the water still flowed in his day in the channel connecting the Caspian and the Aral.

Levchine thus describes the process of desiccation of the northern borders of the Caspian. For 100 versts from the mouth of the Ural to that of the Emba the shores of the Caspian are crowded with reeds; interlacing by their roots they form islands which retain the sand and thus become solid. Thus, wherever the shore is reedy, the sea is crowded with small islands. These islands increase in size and join the banks, and eventually form gulfs and bays, &c. This labyrinth of bosphoruses, gulf-banks, and islands forms here in fact the shores of the Caspian. Thus the land gains on the sea. Again the gulfs of the sea are closed by a barrier of reeds, and become salt lakes. Crowded with aquatic plants, they diminish in size, grow into salt-marshes, and eventually into dry land. This gain of the land upon the sea, this gradual diminution of the water which enables the reeds to encroach, is therefore true of the northern Caspian. Let us

continue. I quote from Pallas, the desert of the Gaik (or Ural), as well as those of the Kalmuks, and that of the Volga are covered with shells exactly like those found in the Caspian. The soil uniformly consists of sand or a yellow loam, generally impregnated with salt. There is no black soil or turf. . . . . It is probable that the high country between the Don and the Volga and along the Sarpa, as well as the heights between the Volga and the Jaik, now called Oblahei Sirt, have been the old banks of the Hyrcanian Sea, for there we meet with horizontal strata, no salt, and plenty of turf. Further up in the mountains of the Volga are large banks of shells, but different to those now found in the Caspian. . . . . It is very probable, nay almost beyond a doubt, that the low country of Ulagami, Terink, Alabrya, and Byeloe is the old bed of the strait connecting the Caspian and the Sea of Azof. Even to this day the Caspian, when swelled by tempests, easily overflows the low country just mentioned. The sandhills which intervene between them and the Manytch originate from sandbanks thrown up by the Caspian. These banks have choked the mouth of the Kama, which formerly had a free current into the Caspian.*

A stage of desiccation may be noticed in the pages of the Byzantine historian Priscus, who tells us that the Huns in invading Persia crossed first a steppe, then a morass, and lastly the mountains.

Hecatæus supposed the Caspian to be connected with the Euxine by means of the River Phasis. Strabo refers to this notion as one invented by the geographers of Alexander's expedition, but he himself affords evidence in the size he gives the Mæotis, of its probable extension as far east as the mouths of the Volga in earlier days. Polybius even foretold, from changes going on in his day, that it would be speedily choked. Scylax makes it one-half the size of the Euxine, Herodotus still larger. The evidence comes down to our own day, for the map of the Mæotis drawn up by the Russians in 1773 shows, we are told, many banks and tongues of land which are constantly appearing in it. These extracts and notes will suffice.

I have now completed a rough and slight survey of the great mass of land that surrounds the North Pole, and have shown that, so far as we have any evidence, that great mass is undergoing a general movement of upheaval; or, to be perfectly correct, we find on it traces in all directions that there has been a movement of upheaval since there was any subsidence; and in those areas, which are accessible enough to enable us to experiment, as in Scandinavia, &c., we find that the movement is

* Pallas's 'Travels in Southern Russia.'

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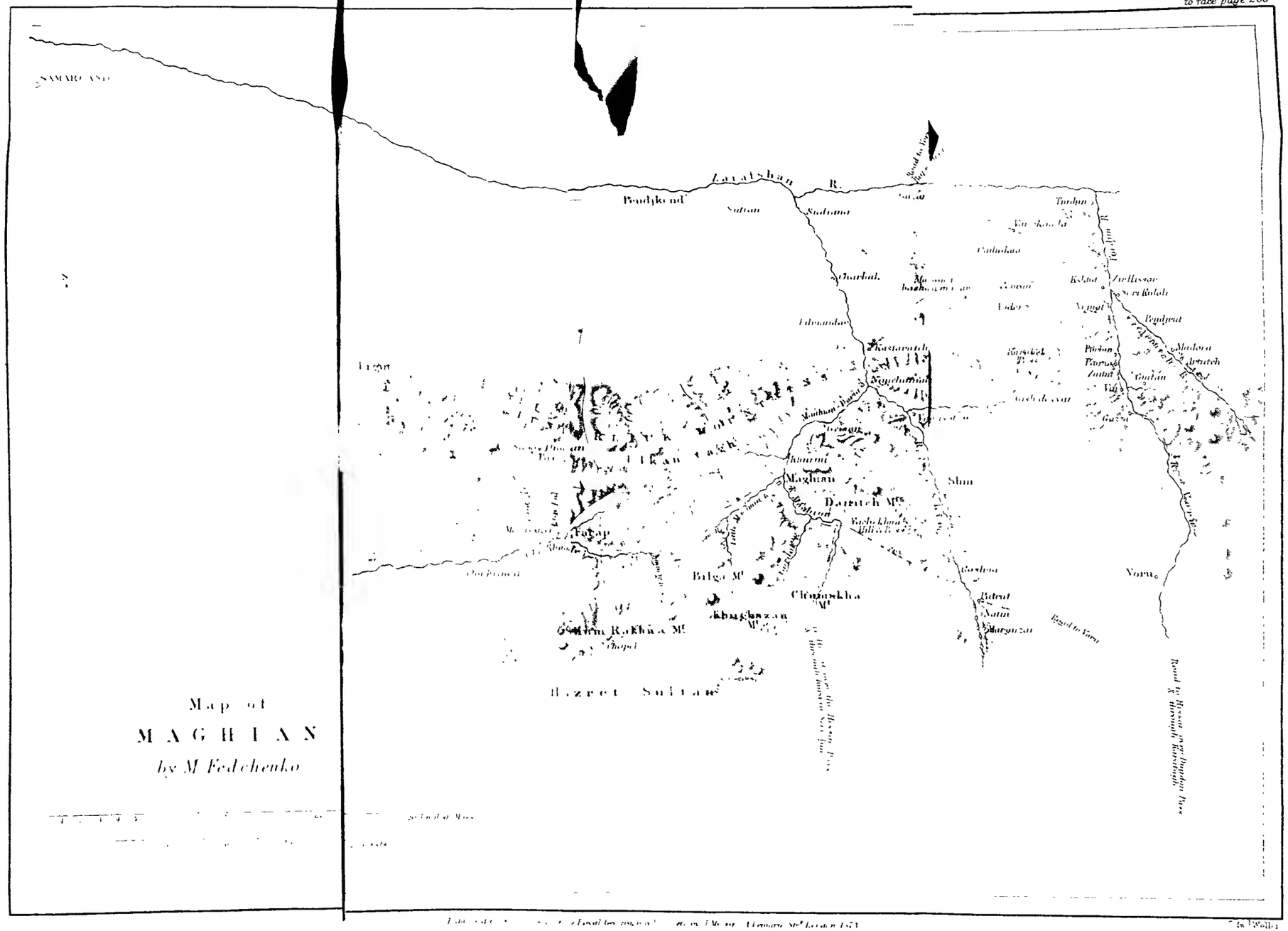

going on now at a greater or less rate. This general movement of Circumpolar land having its focus apparently near the Pole, has no doubt been coincident with a corresponding revolution in other physical phenomena, such as climate, the distribution of magnetism, &c. I shall revert to this in a future paper if the Society does me the honour of accepting this one. There is one fact which is very obvious upon which I hope to enlarge, and that is that in the vast area over which we have shown that there are traces of upheaval, there is not, so far as I know, a single volcano. If the ancient theory that volcanoes are due to the eruptive forces of the earth be true, this fact requires explanation. I believe that theory to be entirely false, and that the researches I have been making, of which this paper is the first fruit, enable me to offer a much more reasonable theory of volcanoes.

XI.—*Notes on M. Fedchenko's Map of Maghian.*

By R. MICHELL, Esq.

THE accompanying map by M. Fedchenko is copied from the original in the 'Proceedings of the Russian Society of Natural Science, Anthropology, and Ethnography.' It has been forwarded by the author, together with a brief account of the Maghian Bekship, written from data collected by him during a short journey from Samarcand to Urgat, and thence to Maghian and back to Samarcand by the Zarafshan River. To be more particular, his route was as follows:—

On the 16th of September, 1870 (N.S.), he was at Urgat; on the next day, crossing the Sangy-Djuman Pass, he reached Farap. On the 18th he traversed the Firkok Pass, and was in Maghian. From Maghian, M. Fedchenko made two excursions: one up the Maghian defile to Vachekhna Pass, and another to the Bilga Mountain. On the 21st of September he descended the Maghian Valley to Kastaratch village. On the 22nd he reached Pendjkend, and on the 24th he was again in Samarcand. It was during this short excursion that M. Fedchenko gathered the materials for the accompanying map, showing the hydro-orography of Maghian.

1. *Maghian*, the central point on this sketch-map, is situated direct to the east of Farap, and almost directly south of Pendjkend, on the Zarafshan, from which it is separated by a chain of mountains. From the lands of Pendjkend Maghian is separated by a mountain, locally called Ulkan-tagh. On the western side Maghian is conterminous with the lands of Farap and Shar-i-

Sabz; on the south with the Bekship of Hissar, and on the east with that of Kshtut.

It is, at present, impossible to define the line of boundary in the direction of the Emir's territories in this quarter. It is said, however, that this boundary passes along the watershed, and that the Bekship of Maghian includes the entire basin of the Maghian-daria, with the exception of the mouth of the river, where there is a settlement called Sudjana, which belongs to Pendjkend. The basin of the Maghian-daria embraces two large streams: the Maghian and the Shin. Both these streams have their sources in the snow-clad mountains dividing the Maghian lands from those of Hissar.

The Maghian-daria takes its rise in a locality called Hazar-Chashma, or thousand springs. This river's course, which is about 33 miles, is unknown. M. Fedchenko ascended it only 8 miles from Maghian to the Vachekhna Hill. This hill is only a small spur of the Chumakha Mountain; it obstructs the river, and divides it into three streams. Ascending this hill by the road which leads over into Hissar, M. Fedchenko could see about 5 miles further up the valley; beyond that it was hidden behind a mountain projection. M. Fedchenko was told that the river flows direct north all the way to Vachekhna from the Chumakha Mountain. From the Vachekhna Hill the river turns abruptly to the west, and continues running in that direction up to within about $3\frac{2}{3}$ miles of its confluence with the Gurdak. Through this extent of its course the Maghian tumbles in a series of cascades through a precipitous defile. The road lies between immense boulders scattered along each side of the stream, and passes repeatedly from one bank to the other over small bridges. Above Vachekhna the defile is equally narrow, but the road appeared to be better and softer.

After receiving the Gurdak streamlet which issues from the foot of Hazret-Sultan, and joins it on the left, the Maghian-daria turns to the north, with an inclination towards the west. Here it enters a more open country; its right bank is flanked by the high and rugged Dairitch Mountains, and along its right bank is an undulating surface, on which is situated Maghian, with its gardens. This locality represents a hollow, surrounded on three sides by high and rocky mountains, and on the fourth, or western side, by hills of an insignificant height. There are three peaks in the mountains on the south: these are Chumakha, the eastern-most; Bilga, and Khirghazan, on the west.*

* This is what M. Fedchenko observes in a note about the Hazret-Sultan Mountain:—"Hazret-Sultan elevates his head behind the middle peak or Bilga. The side of this mountain facing Maghian is a perpendicular wall; towards Shahr-i-Sabz (west) it is sloping, and the Djiny-daria and Ak-daria issue from its

Further on are the spurs of the Shum-Rakhna, and beyond these the passes of Zirak and Pordan, with the intervening Chakyl Mountains. On the north lie the Ulkan-tagh, and on the east the Dairitch Mountains. The hollow thus formed is filled with hillocks detached from the main ranges. Those forming the offshoots of the eastern range of mountains stretch in a regular series as far as the river, and terminate in denudations of various-coloured clays, and of red clay in particular, exactly similar to those tertiary clays so familiar to me in the upper valley of the Zarafshan.

There are three rivers flowing between the mountains above named and the hillocks; the largest of these, to which the natives extend the name of Maghian-daria, and which I shall call the Little Maghian, issues from the base of Hazret-Sultan, and flows at first through a defile between the mountains Bilga and Khirgazan. On emerging from this defile it receives an affluent in the Iziam stream, which takes its rise in the vicinity of Shum-Rakhna. M. Fedchenko did not explore this corner of the hollow in question. In its general features he believes his description to be correct, though there may be a great many particulars which will have to be filled up. After receiving the stream above mentioned, the Little Maghian turns to the north-east, and falls into the Maghian-daria a little below the Kurgan.

The third river flows from the Pordan, and falls into the main stream at the village of Khurmi.

From Maghian the main river somewhat alters its course. It turns off a little to the east, and pursues that direction for about 3 miles. It then deflects further and further to the east, and, passing by the village Geisan, flows direct east, but, having passed this village, it turns again to the north-east, and finally disembogues into the Shin.

All M. Fedchenko's information concerning the Shin was gathered from natives, so that it is very superficial. The Shin takes its rise in the same mountains from which the Maghian

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gorges on that side. I believe the accounts of its height to be exaggerated; and, judging by the surrounding elevations, think that it does not rise higher than 15,000 feet. On its northern side its covering of snow seemed to be light and fresh. There had been rain below the day before, and snow had fallen on the heights: yet it may be that the perpendicularity of the northern side of the mountain prevented any great deposit of snow upon it. I failed in my attempt to examine the mountain closer. With great trouble I ascended the Bilga to a height of 9700 feet, when approaching darkness obliged me to turn back. There is no road from Maghian to Hazret-Sultan, and those who make pilgrimages to the mountain proceed up the valley of the Djiny-daria. There is a road leading from Farap, but it passes through the Shahr-i-Sabz village of Shirat, which is likewise on the Djiny-daria. It is believed by the natives that a Saint Hadja-Sultan-Hadja-Daria once took refuge in the mountain, and that he is alive there still. Owing to this legend, the mountain is held in esteem by the people, who go to worship on it."

issues, and runs a course of 40 miles before its junction with the latter. It runs for the most part through a very narrow uninhabited defile, but beginning from within 14 miles of the river's junction with the Maghian there are smooth places suitable for habitation. About 2 miles above this extent begins a series of lakes, produced by the gigantic rocks which obstruct the river. These lakes are eight in number, and bear the collective name of Shtu-kul; some of them, however, are called Rashna-kul and Kuli-Margazar, after settlements in their vicinity. The size of these lakes is insignificant, the second of them going up stream is less even than a third of a mile in length. The views which M. Fedchenko obtained from the Bilga Mountains and from Charbak induce him to believe that several snowy peaks rise along both sides of the defile about this part of the river's course. About 3⅓ miles above the junction of the Shin with the Maghian, the former turns away towards the west. The river increases very considerably. Up to Kastaratch, for more than 3 miles, it flows through a narrow defile; at this settlement the rocky mountains terminate and the river runs between undulating hills composed for the most part of conglomerate. A little above Charbak the river enters a wide valley between the undulating hills, from which it emerges at Sudjan, where it empties itself into the Zarafshan.

The Maghian Bekship embraces about 1500 square versts, or about 215 geographical square miles, but a very small portion of it is suitable for permanent habitation; these habitable parts are the hollow about the Kurgan or foot of Maghian, the small terraces by the Maghian, Shin, and Yish-darvar rivers and the valleys in the undulating steppe. Owing to the lack of cultivable lands the people of Maghian migrate to the neighbouring bekship of Farap, to sow the luxuriant fields in which that bekship abounds.

The following are the names of the towns, villages, and settlements in the bekship of Maghian:—

1. Maghian, with a fort built upon a rising ground, which is the place of residence of the Bek. The town is situated on the left bank of the Maghian River at its junction with the Little Maghian. Although Maghian was the central point of three bekships, its appearance in no respect differs from that of the poor villages in the mountains. It has no bazaar; not even a single shop. The Mesjid is a common hut made of clay. The altitude of Maghian is 4700 feet.

In the vicinity of Maghian the small villages are called:—

2. Kishlaki. 3. Kshtuti. 4. Fani.

These are not appellative nouns. "Kishlak" or "Ksihlak,"

which means simply village, signifies in this case a certain community. What the derivation of the word is, the natives themselves are unable to explain.

The *Kshtuti* and *Fani* are settlements of people from the bekships so-called.

The gardens and fields surrounding these settlements are also collectively called Maghian; they are scattered over a wide extent, and stretch along the entire courses of the Little Maghian and Iziam rivers.

5. *Khurmi* is situated at a point where the Maghian receives a small tributary. The places above that point of the river are:—

6. *Sor.*

7. *Geisan,* divided into two groups of settlements (Geisani-bal and Geisani-païn) by a small spring, situated on the right bank of the Maghian.

8. *Auchamak,* opposite the confluence of the Maghian and Shin on a high hill on the left bank. This is a small settlement composed of four houses, established several years ago by Nurali, a taksobd (colonel) in the service of the Emir of Bokhara. The old man, then 84 years of age, settled here with his kin; he cultivates the ground, attends to his little gardens, and but rarely presents himself in Maghian.

9. *Kastaratch,* immediately at the point of the issue of the Maghian-daria from the rocky Kishlak defile.

10. *Filmandar,* 2 miles lower.

11. *Charbak,* a large settlement in the wide valley of the Maghian-daria, only $5\frac{1}{3}$ miles from the junction of the river with the Zarafshan.

All the other settlements or *Kishlaki,* with the exception of *Andar* (see further on, 19), lie along the courses of the Shin River and its affluents.

12. *Vagashtan,* the first *Kshilak* on the Shin, $2\frac{2}{3}$ miles above the confluence of the Shin and Maghian.

13. *Shin,* 6 miles higher up; a large settlement of about 100 houses, situated on both banks of the river.

14. *Rashna,* a large settlement of 70 houses, $5\frac{1}{3}$ miles above the last named. Beyond Rashna the settlements are very small, being composed of only two or three houses; they are:—

15. *Patrut;* 16. *Nafin;* 17. *Marguzar.* These are in the vicinity of the lakes above referred to, and are the southernmost points of settled life in the *Shin* Valley.

The following settlements occur in the mountains, along a small stream which flows into the Shin at Vagashtan:—

18. *Gish-darvar,* a settlement of 80 houses.

And 19. *Andar*, by a small stream running to Varsikanda. This village is 8 miles to the north from Gish-darvar, beyond the Karabel Pass.

The inhabitants of these settlements are said to number about 3000, *i.e.* 2000 in the Maghian settlements and 1000 in those of the Shin.

Filmandar, though situated among the Maghian settlements, is classed with those of the Shin; it was probably established by people from the Shin Valley.

The inhabitants of the bekship of Maghian are all Tadjiks.

2. The bekship of *Farap* occupies the upper waters of the Bashir-su River, which runs into the Shahr-i-Sabz province. This bekship extends 10 miles from east to west, and between 9 and 10 miles from north to south, consequently it embraces about 94 square miles of territory. Its limits are considered on the north the Tuniurliuk Mountains, rising to a height of 8000 feet, which separate this bekship from the Urgut territories. On the south a range of mountains, not 7000 feet high, beyond which, in the valley of the Djiny-daria, are the lands of Kitab. On the east and west this bekship has no natural limits; on the side of the Kitab lands it is bounded by a locality called Bursi-Kazi. Obi-Kishlak, situated immediately opposite, $2\frac{2}{3}$ miles west of lower Musa-Bazar, is also considered its farthermost limit.

On the east the Farap lands do not extend as far as the pass, but only up to the junction of the Khundy and Kandy-Bas streams.

The character of the Farap bekship is very distinct from that of the neighbouring bekship of Maghian, It may be said to occupy a table-land of an altitude of about 6000 feet, with undulating hills covered with a soft rich soil. Several streams flow between these hills, which ultimately unite into one stream, called Farap-daria, within the limits of the bekship and Bashir-su, lower down in Shahr-i-Sabz. The main head branch of this river is the Obi-Khundy, which issues from the Shum-Rakhna mountains, 4 miles to the east of Farap. This stream first runs to the north, and then turns westwards: soon after this turn it receives the Kandy-Bas, which is sometimes called Khudja-Mansur, after a Saint who was buried in the neighbourhood. After receiving the Kandy-Bas, the river continues to flow in the same direction, and passing Farah receives a considerable tributary in the Karatam. Below this it is joined by the Utchkal and Karateghin-su: the last-named river flows from the Sangy-Djuman Pass.

There are only two settlements in this bekship, Farap and Musa-Bazar. The last-named is composed of Upper and Lower

Musa-Bazar. Upper Musa-Bazar is at the mouth of the Utchkal: the lower one is about 2 miles distant. Farap is also divided into Upper and Lower.

The inhabitants of Farap are Tadjiks; those of Musa-Bazar are Uzbegs. The Tadjiks are nicknamed Akkia (crows), from the fact that a member of this community when in the Shin Valley peached upon one of his three brothers who had stolen a goat. For this he was called Akkia (crow, or bird of ill-omen), a sobriquet which attached itself to the three brothers, and which caused them so much annoyance that they removed to Farap. The Uzbegs are of three tribes: Ballas, Kallatai, and Musa-Bazar. Musa-Bazar is called after the latter. There are Uzbegs of this tribe in Shahr-i-Sabz and in the Djiny Valley, where there is another Musa-Bazar Kighilan or settlement.

The Farap settlements consist of a very condensed group of clay buildings, with small courts for cattle; they have no gardens, only a few scattered willow-trees. The inhabitants are said to number about 1500.

We pass now to Urgut, the third component part of the Maghian dominions.

All that M. Fedchenko has to say on the Bekship of Kshtut is contained in a list of the settlements in that bekship; these are:—

1. Zir Hissar ..	Kshtut proper is only a kurgan, or citadel, in which the Bek dwelt, called Kalei-Kurgan, with the three settlements here bracketed.
2. Sari-Kuloli ..	
3. Nignat	
4. Pendjrut	On the Artutch River.
5. Artutch	
6. Madora	
7. Porbin	Up the Voru River, Guitan is in a side valley opposite Vin. Voru is a large settlement. The distance from Voru to the pass to Hissar is 3 tash.
8. Pagna	
9. Zintut	
10. Vin, or Vingam	
11. Guitan	
12. Gazza	
13. Voru	
14. Chashkat	Down the Turdjin River, at its junction with the Zarafshan.
15. Turdjin	
16. Ogiliakon	On a small river flowing from the Karabel Pass.
17. Zaúran	
18. Varzikanda ..	

The houses number 1000. The inhabitants are all Tadjiks, except in Turdjin and Ogiliakon, where they are Uzbegs or Toorks of the Kaltatui tribe.

ROADS.

The most important road in Maghian is that which leads to Pendjkend: for as there is no bazaar in Maghian, Pendjkend

is the centre of trade to which the people of Maghian take all their produce, and where they buy their bread. The road is open at all times of the year except for four or five days in the middle of winter. When there is a great accumulation of snow on the river side, they pass over the Vachekhna Mountain.

From Maghian the road passes first along the left bank of the river, but at the extremity of the village it crosses over to the right bank. The river is here fordable, but there is a small bridge. It is possible, however, to proceed further along the left bank, as far as Khurmi. Along the right bank the road lies over a very even surface. A road branches off on the right to Shin and to Geisan. The road does not continue long by the right bank, it crosses over to the left side, and following all the bends of the river, passes by Geisan, after which, north of Geisan, it leads to a ford, and emerging again on the right bank, ascends the Vachekhna Mountain. The river here flows in a torrent in a very narrow and rocky bed. The ascent of the Vachekhna is somewhat steep only in one part; on the whole it may be said to be easy. After descending the mountain, the road soon emerges on the Shin at its junction with the Maghian, where it passes over a small bridge. Farther on, as far as Kastaratch, the road runs through a narrow defile along the banks of the river, which is here both deep and rapid. At Kastaratch the road enters a more open country, and passing by Filikandar Settlement, comes out upon Charbak. There, there is a bridge, and the road leads over to the left bank; it runs for two miles through a vale, and ascending, stretches across an open steppe to Sufian. At this place it forms the Araba road to Sudjana.

There is a more direct road than this to Pendjkend, over the Kubi-Chinar pass. It is only 20 miles long, while the first one is $26\frac{2}{3}$ miles; but it is practicable only in the summer, and used exclusively by asses. Besides the road above described there is another road to Shin, passing up the river of that name from its mouth.

The most frequented and convenient road to Kshtut runs through Kastaratch. At this place a road branches off from the one above described, and turning to the Penjkend settlement, called Hudjà-Mahomed-bashara-mazar, proceeds to Zaùran, which is a village of Kshtut. From Shin there is another road through Gishdarvar over the Karabel pass, and through Andar and Zaùran.

It is possible to proceed from Maghian to Kshtut by another, although a very difficult road. This road from Maghian first trends to the south along the Maghian River as far as the base of the Vachekhna (upper) Mountain, where it crosses by a bridge to the left bank of the river and ascends the valley to

the Charraga pass. From this pass it runs down to Rashna Settlement, crosses the Shin River, and opposite to Patrut it again ascends a defile to the Angari-mash pass, whence it descends to the Voru rivulet through the Archamaidan and Sarmat defiles.

There is a road from Maghian leading to the Hissar territories, through the defile of the Maghian-daria. The pass over the water parting is, however, very difficult: the road descends to the Hissar fort, or Kurgan, called Seri-djui. There is also from Shin a road to Hissar over the Sibisrukh pass, whence it leads to Khorat. Both these routes are extremely difficult, owing to the passes and to the bad condition of the roads in the narrow gorges, where they are obstructed by immense fragments of rock. For this reason they are used exclusively for driving cattle purchased by the people of Hissar in Maghian.

The road from Kshtut to the Voru defile, and over the double Dugdan pass, which emerges on the Hissar village of Karatagh, is, on the other hand, described as a very easy one. It is used by the people going to the bazaar in Bash-Hissar (the capital town of the Hissar Bekship), where the people of Kshtut buy their bread.

The following are the roads into Farap, known to M. Fedchenko:—

1. From Urgut through Sangy-djuman (or Rocking Stone). This is the main road of the inhabitants of Farap; it takes them to the bazaar at Urgut. It leads from Urgut through Gous and by Gish-duvau. From the latter place it leads up an easy ascent of a small mountain spur; it proceeds up and down over this spur, and at last runs up a most difficult ascent, zigzagging over bare rocks. Further on, the road again, along the skirts of the mountains, descends to a rivulet, and approaches the principal pass. Although the ascent is steep, it is not difficult. The road leads across a very coarse sand, between sand-mounds scattered over the mountain-slope. At the foot of this last ascent, a track leads directly off to Maghian. The Sangy-djuman pass was but lately considered the point of limitation between the Farap Bekship and the country occupied by the Russians; the people of Farap maintained a picket here. The descent is very sloping and leads down a spur on the right side of the Karateglin ravine. Approaching the Farap-daria the road crosses the Karateghin-su. From here it is not more than two-thirds of a mile to Upper Musa-bazar. The road proceeds for about two-thirds of a mile more along the Farap-daria; it then runs over a bridge across the Karatash and leads uphill, descending again into the valley to Farap. In its present condition this road is practicable only for horsemen and pack-

horses, but it might easily be made suitable for wheeled carriages.

2. From Pendjkend over the Arzanpai pass, which is very difficult for horses; asses alone are driven over it.

3. From Kital over the Cha pass to the south of Farap. This road is very easy, and the inhabitants consider it a distance of only *one tash* (5 miles?) to the first Kital settlement.

4. From Kital to the Bashir-su valley.

5. From Maghian over Pordan pass.

6. From Maghian over Zirkak pass. From Farap the ascent is insignificant and (only 1000 feet) gradual. The descent to Maghian is at first steep, it then runs down a small spur, and along the bottom of a vale, in front of Maghian, the road emerges on an open place. This road is, on the whole, very easy.

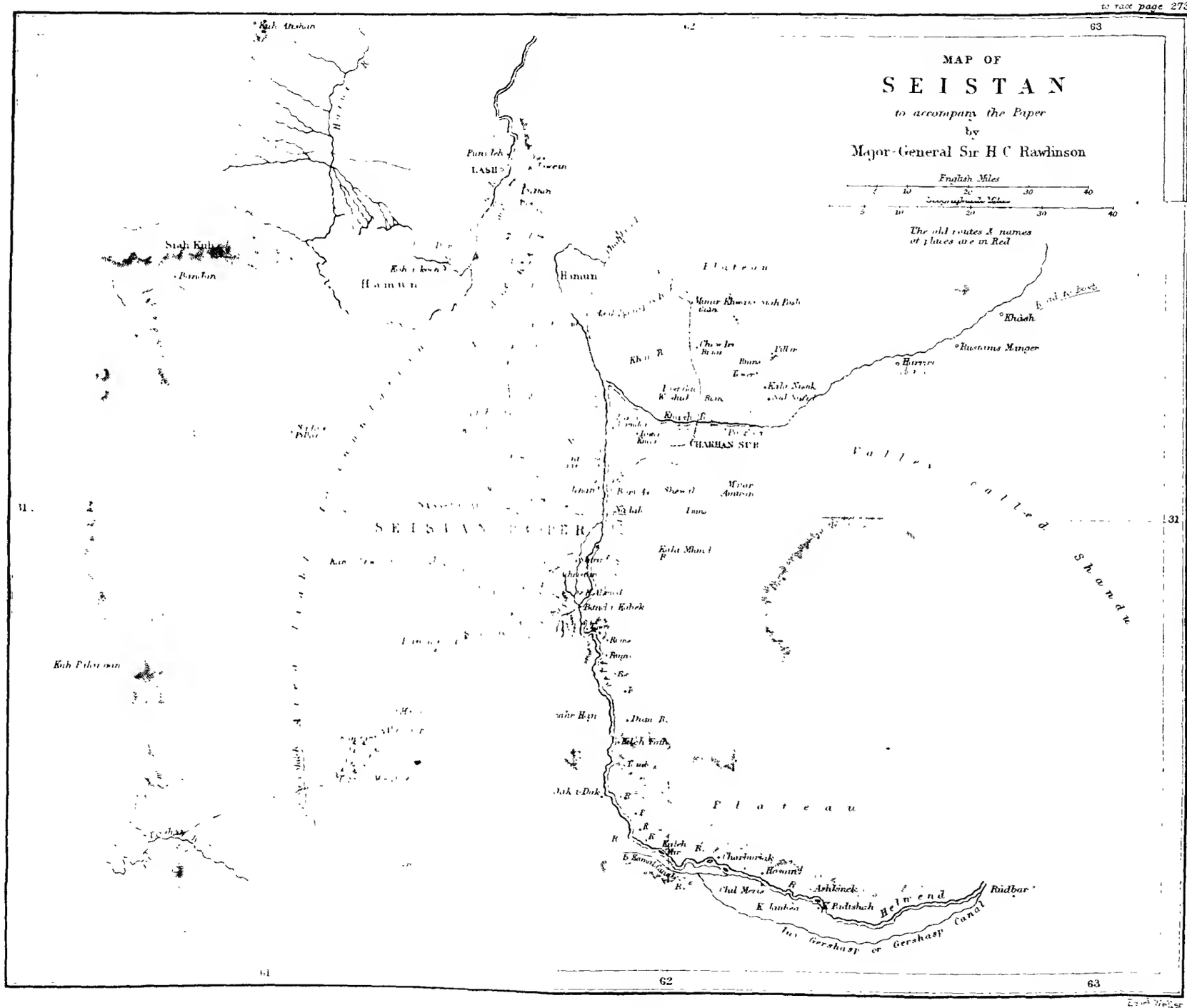
XII.—*Notes on Seistán.* By Major-General Sir H. C. RAWLINSON, K.C.B., President R.G.S.

[*Read*, January 27th, 1873.]

THE province of Seistán is so little known, and is of so much political interest at present as a debateable land between Persia and Afghanistan, that I venture to supplement Sir F. Goldsmid's paper by a few notes on the ancient history and comparative geography of this part of the East.

It has been well stated that, "if we look at the character of the physical geography of Central Asia, we observe everywhere a conflict, as it were, of the forces of nature, which may well remind us of the struggle between the principles of good and evil that was the dominant creed of the old inhabitants of the country. The desolation of the desert is brought face to face with the beneficent influence of the mountain-ranges. Where the streams bring down the mountain detritus, and deposit a thin coating of soil, the sandy waste withdraws for a space before advancing cultivation; but it re-asserts its supremacy immediately the influence of irrigation is withdrawn." * Seistán is a good illustration of this law of nature. It is dependent entirely on the River Helmend. The alluvial soil, duly supplied with water, is fertile in the extreme; but, if the water from the river is cut off, the country becomes a barren waste, and is soon again covered with sand. In ancient times, when the Arian colonists first settled along the Helmend, it is

* 'Quarterly Review,' No. 240, p. 487.



Geographical Society by J Murray

probable that they consumed all the water of the river in irrigating their fields, so that there was no residue to form a lake; for, in the earliest geographical list—that contained in the Vendidád—the country is not called from the lake, as it afterwards was, but from the river. *Haêtumat*, which is the original form of the modern Helmend,* follows *Haraqaiti*, or Arachotia,† as the eleventh country created by Ormazd, and that the country thus indicated is really the Seistán of modern times, is proved by another peculiarity of local nomenclature. In Persian romance universally, and not unfrequently in standard works of history and geography, Seistán is known by the name of *Nímrúz*, that is "mid-day" or "meridies," the South; but Seistán is not south of modern Persia. It is north-east of the great seats of later Persian royalty at Persepolis and Susa, and the title has thus often been remarked on as a misnomer. If we take the primitive Irán, however, such as it is marked out in the Vendidád, then Seistán will be found to be really the extreme southern limit of the empire, and the title of Nímrúz becomes most appropriate.

The earliest mention of the lake-title occurs in the enumeration of the provinces of the empire in the inscriptions of Darius Hystaspes, where Zaraka is joined in one list with Aria (Herat), and in another with Arachotia (Candahar). *Zaraka* simply means "the lake country," *Zarayo* in Zend, and *Zaré* in Pehlevi, being the original of the Persian *Zár* in *Neizár*, "a reedy swamp," *Múrghzár*, "a place for wild-fowl," &c.‡ In the time of Darius, therefore, which was, perhaps, one thousand years after the first Arian colonisation, there must have been a lake, and this lacustrine title has appertained to the region ever since, although, with the exception of the possible application to the lake of Seistán of Ptolemy's name of Aria Palus, there is no direct notice of so remarkable a feature of physical geography by any Greek or Latin author.

From the original name of Zaraka, which, by a law of old

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* Bournouf, in his 'Commentary on the Yaçna,' has an exhaustive note (p. 93) on the etymology and application of the name of Helmend. He quotes and explains all the various forms of *Setumat* (Sans.), *Haêtumat* (Zend), *Itomand* (Pehlevi), *Ἐτύμανδρος*, or *Αἰτύμανδος*, *Ἐρύμανθος*, Hermandus, Hindmend, Hermend and Helmend, and decides that the original meaning of the name was, "having bridges or causeways." See Yaçna, 'Notes et Éclaircissemens,' p. 93.

† *Haraqaiti*, in Zend, is equal to *Sarasvati*, in Sanscrit "having water," and refers, no donbt, to the irrigation of the *Arghand-áb*, which is indeed the same name. In Achæmenian Persian the name is written *Hara'uwatis*, which was corrupted by the Arabs into *Arrukhaj*. The original capital ascribed by the Greeks to Semiramis, was at *Olán Robat*, midway between Candahar and Cabul; the later capital was at *Penjwái* on the *Arghend-áb* below Candahar.

‡ *Zarayo* or *Zaré*, "a lake," and *dariya*, "the sea," both come from the Sanscrit *hari*, "green." See Bournouf's 'Notes to Yaçna,' p. 98.

Persian orthography, becomes *Zaranj*, all the various Greek and Latin titles of the province have been formed. Herodotus calls the people Sarangians, and joins them with the Sagartians, who were a kindred Arian tribe. The historians of Alexander usually corrupt the name to Drangæ and Drangiana, the *z* being often hardened to a *d* in Persian; while Pliny has both forms of Drangæ and Zarangæ, and the Arabic orthography of *Dharanj* is midway between the dental and sibilant.*

The Greeks had a very early tradition, acquired in the country apparently at the time of Alexander's expedition, that Cyrus, being reduced to great straits in his Scythian war, received most valuable aid from a tribe named Agriaspæ, or Ariaspæ, residing in the southern part of Drangiana, in acknowledgment of which aid he gave them the honorary title of Euergetæ, or "the benefactors." † There is no doubt some foundation for this story, the Scyths with whom Cyrus was at war being—not the nomades beyond the Jaxartes, but the Turanian tribes who held both the Hazáreh Mountains and the arid plains of the modern Belúchistan, thus threatening the Zarangian Arians on the north and south. The Agriaspæ were probably the extreme outlying Arian tribe who held the city of Agriaspa on a canal derived from the Helmend, which extended three stages from Zaranj on the road to Kermán, this site of Agriaspa being afterwards occupied by the Sassanian city of Rám-Shaharistán. The Greek story refers certainly to the same period of history, and, in all probability, to the same series of events, which furnished Persian romance with the noble and stirring tales of Gershasp and Sám and Rustum leading the forces of Seistán to fight against the foreign enemy Afrásiáb in the service of the Kaianian kings.‡ It is hardly,

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* Bournouf discusses the name of Zarangia in continuation of his remarks on the Helmend, and leaves nothing for further controversy. See 'Notes to Yaçna,' p. 96. For an abstract of all the classical notices, see 'Cellarius,' vol. ii. p. 723.

† See Arrian, 'Exped. Alex.,' lib. iii. cap. 27, and Quint. Curt., lib. vii. cap. 3; and for explanation of the name of Ὀροσάγγαι, said by Herodotus to answer in Persian to the Εὐεργέται of the Greeks, consult Rawlinson's 'Herodotus,' vol. iii., p. 331, note 8. Bournouf also ('Yaçna, Notes et Éclair.,' p. 99) compares Mount *Houguer* or *Hukairya* of the Zend books with the Greek term. It is certainly singular that the tribes of *Shignán* and *Oroshán*, north of the Oxus, should be associated geographically, very much as the Σάκαι and Ὀροσάγγαι were in antiquity; but this is probably a mere coincidence. Bournouf's matured views on the etymological connection between εὐεργέται and ὀροσάγγαι are given in the 'Journal Asiatique' for 1845, p. 261, note 2. I am rather inclined myself to believe in a connexion between the *Agriaspæ* and *Orosangæ* on the one side, and the brother-warriors of Seistáu on the other, who are named *Gershasp* and *Urvakhsh* or *Urukhsh*.

‡ Sám and Gershasp belong to a very early period of Arian development, being often mentioned in the Zend books, and having their prototypes in Puranic mythology. Curiously enough Sáu has the title of *sevisto*, or "the benefactor." See 'Journal Asiatique' for 1845, pp. 251 to 262. In later times the romances of

indeed, too bold an idea to suggest that Gershasp, who is stated to have founded the primitive capital of Seistán, personifies the tribe of Agriaspæ, who gave their name to the city in question. To those who know how completely the legendary history of Rustum has entered into the soul and spirit of the Persian people, and how largely it has helped to form the character of the nation, it must, then, be of interest to reflect that a germ of historic truth thus lies at the root of the whole fabric of romance; that, in fact, there really was a native Arian aristocracy, in the sixth century B.C., struggling against the Turanian invaders from the East; that the loyal service of the Seistánis was acknowledged by some special marks of royal favour; and that these honours were treasured in the country, and gave rise to a school of romance, which, after 800 years of strictly local cultivation, was ultimately grafted into the national system by the Sassanian kings, who became identified with the Seistánis in consequence of renewed conflict on the eastern frontier between the Persians and their Scythic enemies.

Alexander the Great traversed Drangiana in his passage from Aria or Herat to the Indian Caucasus. It was in the northern capital, to which the Macedonians gave the name of Prophthasia, but which was known in the country as Frada or Fra,* as it is at present, that Philetus, the son of Parmenio, was arrested and executed for conspiring against the life of the king; and it was from the same spot that messengers were despatched bearing the death-warrant of Parmenio, who was then Governor of Ecbatana or Hamadan: these messengers, who were mounted on swift dromedaries, passing from one city to the other, a distance of 700 or 800 miles, in eleven days.† On Alexander's return from India he also sent a light column from the Indus by way of Arachotia, Drangiana, and Choarene; that is, by way of Candahar, Seistán, and Kharán, to unite with the main body in Carmania or Kermán; and these troops followed, probably, the exact route which Sir F. Goldsmid has described as leading from Bam to the lake.

After the break-up of Alexander's empire, the history of

the *Sám-námeh* and *Gershasp-námeh* furnished Ferdúsi with materials for his great epic. *Sám's* fort is still known in Seistán, and the old canal which once flowed to *Rám-shaharistán* retains to the present day the name of "Júí-Gershasp." Hamdullah tells us that Gershasp founded the capital of Seistán, meaning, however, probably *Zaranj*. The Sám-námeh was chiefly taken up with an account of the three expeditions of Sam against the *Sakasarán* (a Scythian race), by order of Feridún.

* Cellarius has collected most of the ancient notices of Drangiana in vol. ii. lib. iii. cap. 23, sec. iii. Isidore mentions Φρὰ, as the name of the chief city of Anabon, which joined Aria to the south, and Stephen quotes the same author for the identity of Φράδα, as he writes the name, with the Macedonian Prophthasia.

† See Strabo, lib. xv. sec. 8.

Drangiana becomes somewhat obscure. A number of independent principalities were established under Greek or native chiefs in the countries intervening between Persia and India, and the ethnography of the whole region became very sensibly affected by the continued immigration of Scythic hordes, who overthrew the Bactrian kingdom in about B.C. 120, and subsequently spread over Northern India and Eastern Persia.

The Sacæ and Massagetæ, who must be identified with the Sai and the Greater Yuechi of the Chinese, are joined by the Greek geographers of this period with the Arachotians,* and can be shown, therefore, to have occupied the mountains at present held by the Hazárehs between Cabul and Herat. Here, then, I think we must place the Sacastane of Isidore (who wrote within two centuries of Christ), and not in the lake country to the south. The name, indeed, merely signifies the country of the Sacæ; and that it was a mountainous region is shown by its synonym of Parætacene, from *Parwat*, a mountain.† The names of towns, moreover, assigned to this province show, I think, that these Sacæ were of the Turkish, and not of the Hunnic, or Ugrian family,—the name of Palacenti, for instance, having a pure Turkish termination, and Min, another of the Sacan settlements, being the Turkish equivalent of the Persian Hazáreh—"a thousand." Late numismatic research, indeed, compared with Chinese history, shows that the Sai, or Saka Scythians, being driven out of Bactria by the Tochari in about 130 B.C., conquered and occupied the Hazáreh mountains under their king Vonones.‡ Their original seats were probably along the Upper Arghendáb and Helmend rivers, in a country called Kipin by the Chinese and Cophen by the Greeks;§ but in process of time they spread their conquests over the whole mountain region, and gave it the name of Sacastene. At what particular time they descended from the mountains to the plains, and, following down the bed of the Helmend, imposed their name on the country of Drangiana, cannot be positively shown; but we know from Agathias, as well as from the Persian writers, that Vararanes II., towards the close of the third century of Christ, was engaged in war with the Sagastánis, and, to commemorate his successes, gave to

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* Eratosthenes, quoted by Strabo, lib. xi. sec. 5; and compare Stephen *in voce* Ἀραχωσία.

† Σακαστηνὴ, Σάκων Σκυθῶν, ἣ καὶ Πραιτακήνη. Min. Geog. Is. Char. p. 8.

‡ General Cunningham's 'Memoir on the Indo-Scythians,' in his Archæological Report for 1863–64, p. 43, may be consulted for this period of history. I do not agree with him in all its details, but his general accuracy is undoubted.

§ This name is, no doubt, derived from the Persian *Kúp*, "a mountain," and it is singular that the ruins of the capital of Arachosia, called Cophe or Cophen by the Greeks, still retain the Mogul name of *Olán* Robát, "the *mountain* castle."

his son the honorary title of Sagán Saa, or "King of the Sacæ."* Now these Sacæ were assuredly Scythians, and not Persians; but whether the scene of conflict between the Sacæ and Vararanes was in the Hazáreh mountains, or about the lake, is uncertain. The most natural explanation is, however, that the Sagán, or Sacæ, being driven out of the mountains in the third century of Christ by succeeding hordes of nomades (not improbably of Arian descent), descended on Drangiana, from whence they were again expelled by Vararanes, with the assistance of the native Arian inhabitants; the remains of this Scythic nation being met with a few centuries later by the invading Arabs, under the names of Kaikán, Bukán, Túran, and Kúsan, in the arid plains between Seistán, Kermán, and the valley of the Indus. It has been sometimes suggested that the Brahúí-Belúch may have sprung from these fugitive Sacæ; but, considering the very antique character of their dialect, it is, I think, more probable that they are the remnant of an earlier immigration.

It is surprising that the Sacæ, who could hardly have dwelt on the lower Helmend for more than a century, should have given their name for ever to the country of Seistán, but the fact is undoubted. The Sacastane of Isidore, at the close of the second century of Christ, is in the mountains, and is quite distinct from Drangiana, with its two cities of Parin and Korok; while the Sagestán of Vararanes, a century later, is assumed by all the early native writers to have been Seistán. The derivation, indeed, of the name of Seistán, or Sejestán, from Sagastán, the country of the Sagán, or Sacæ, is not doubted by a single writer of credit, either Arab or Persian,† though at the time of the Mohammedan conquest there does not appear to have been a trace of these Scythian colonists in the province. I assume, then, that the city which had the Sassanian name of Rámshaharistán ‡ was built by Vararanes, after he had expelled the

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* Ἐπειδὴ οὖν καὶ τὸ τῶν Σεγεστανῶν ἔθνος Οὐαραράνη, τῷ τοῦδε πατρὶ ἐδεδούλωτο, εἰκότως ἄρα ὁ παῖς Σαγανσαὰ ἐπωνύμαστο. Agathias, edit. Dindorf. p. 261. Compare also Hamzeh Isfaháni, p. 37; Ibn Athír, tome i. p. 280, &c. The Orientals sometimes say that he was ruler of Sagestán while his father was alive, sometimes that the title was merely honorary. I have never seen any account of Bahram's wars with the Segán or Sacæ, except the brief notice in Agathias.

† *Sagán* is said by Hamzeh, as he is quoted by Yacút, in voce *Sejestán*, to be equivalent to the Arabic *Júnd*, "a body of men," or "a legion," and a similar indication is given in the Cuneiform Inscriptions, where the Persian *Saka* for Σάκαι is always rendered in Assyrian by *Gimiri*, not the Cimmerians or Cymri, as I think, but simply the *οἱ πολλοὶ* like the modern *Ulúss*. Compare גמר "the whole."

‡ It is very strange that in the copious notices of the buildings of the old Persian cities, copied from the *Seir-el-Mulúk* by Hamzeh, by the author of the Mujmel-et-Towárikh, and by others, there should be no mention of this city. Little, however, seems to have been known of the life of Bahram III.

Sacæ, on the site of the old Agriaspa, to hold the nomades of the south in chèck; and I would further suggest that it was this episode in history which brought the Persian nation, represented by its king and court, into direct relation with the local legends of Seistán—for shortly afterwards the Armenian historian, Moses of Chorene, for the first time mentions Rustum as the chief figure in the heroic poetry of Persia.*

The comparative geography of Seistán is rendered especially difficult by the constant changes in the lower course of the Helmend, changes which are common to the deltas of most rivers; but which occur with all the greater frequency when, owing to the very slight difference of level, there is no defined basin to receive the waters that are discharged. In Seistán, the so-called lake formed by the residue of the waters of the Helmend, the Khásh-rúd, the river of Farrah, and the Harút, has shifted its position at different periods over an extent of country measuring perhaps a hundred miles in length and fifty in breadth; and the feeding streams have, of course, been curtailed or prolonged in the same proportion. The Helmend, with which we are principally concerned, is shut in by high ground on its left bank (except at one point) as far down as the Band-i-Kohek, the new boundary between Persian and Afghan territory; but below the Band there is quite a radiation of beds, each of which probably at some time or other has held the main body of the river. In very early times a large canal was taken off from the river as high up as Rúdbár; the works required for damming up the main stream and diverting this branch to the left hand having been apparently, from M. Ferrier's description of the ruins, of the most colossal character.† This canal, the bed of which is still known by the name of *Júí Gershasp*,‡ followed the course of the river at a somewhat higher

* It is remarkable that Moses of Chorene in this passage (lib. ii. cap. 8) gives to Rustum the title of *Sak-jik*, or "the Sacan," although the hero in reality typified the Arian race as opposed to the Turanian. This shows that the local nomenclature had displaced the ethnic distinction as early as the 5th century of Christ. The Arabs used the ethnic titles of *Sak-zí*, "a Sacan, *Merú-zí*," "a man of Merv," *Rá-zí*, "a man of Rey," &c., where the suffix probably represents the Persian formative in *chí*.

† 'Caravan Journeys,' p. 410. "Near the spot on which we were encamped (Rúdbár) there was an old dyke, the bottom of which was in the stream. It was constructed of bricks of the same form and size—a yard square—as those of Furrah. A little behind this dyke, and on each side of the Helmend, are high and ancient walls, also of brick, connected with some mounds on which formerly there were in all probability, fortifications; of these there are now scarcely any remains." Lieut. Pattinson, who visited Rúdbár, under my instructions, in 1841, gave me a similar account of the ancient dyke, and General Pollock has recently again visited the spot. It was probably this same dam which, under the title of "La digue de Rustoun," is described as having been destroyed by Timúr in his passage from Ták to Bost.—*Hist. de Tim.*, i. 370.

‡ General Pollock notices this name, which he learnt from the natives of the

elevation for about 50 miles before it found an opening in the southern plateau through which it could penetrate, and here—at the point where the Helmend changes its course from west to north—the work was supplemented in later times by another dam, called the Band-i-Kamál, the canal from this point running off at right angles through the plateau to a position laid down in Major Lovett's map as *Rám-rud*, and which I suppose to mark the site of Agriaspe or Rám-shaharistán.*

At the Band-i-Kohek, where the first great bifurcation occurs, our difficulties commence. General Goldsmid, after a careful examination of the locality, had no hesitation in determining the right-hand branch to be the main stream of the Helmend, and the left-hand branch to be the artificial canal, and this accordingly is the hydrographical distribution adopted in the new map of Seistán; but although such an arrangement is no doubt justified by the present appearance of the river-beds, and is moreover of much convenience for the purpose of territorial demarcation, we must be cautious how we accept it as the normal delineation of the physical geography of the district. For it is quite certain that when Captain Christie visited Seistán in 1810, this right-hand branch of the river below Band-i-Kohek must have been entirely dry, as he passed to the right bank of the Helmend a little below Rúdbár, and then reached Jellálábád, travelling on from that point by Peshawerán to Jowein, without again crossing the river or being impeded by its inundations. Captain Conolly, indeed, who was in Seistán in 1839, learnt on the spot that the Helmend first broke into its present bed nine years before, or in 1830,† the main stream previous to that date having probably passed by Kimmak and Chilling to the lake in the vicinity of Koh-i-Khoja. And if we go still further back, and attempt to trace the marches and routes of early times, we find the same conflicting indications with regard to the course

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country, in his 'Journal.' "The first ruins are those of Púshti Gáo, close to Rúdbár. Amongst them is traced the course of a great canal, called the Júí Gershasp. It is said in ancient times to have irrigated the southern half of the Seistán plain." (Bellew, p. 206.) It is, of course, the same canal which 'Obád followed up in his march from Zaranj to Rúdbár, the title which it then bore being the *Júí Kohneh*, or "old stream." (Beládheri, p. 434.) M. de Goeje does not venture to read this Persian title, though the name is reproduced by Yacút, in voce Kandahár.

* "From Charburjak we followed for some miles along the course of a very ancient canal, which formerly, it is said, irrigated Trakú and all the country to the town of Zirrah. It is called Júí Gershasp, and is said to have been excavated by Gershasp, the grandson of Jamshid and ancestor of Rustum."—*Bellew*, p. 212.

† 'Asiatic Society's Journal,' No. 130, p. 715. "About nine years ago an unusually large inundation changed the whole face of the country. The main stream of the Helmend deserted its old bed, and cutting for itself a wide channel out of that of the small branch which went off from Khwajeh Ahmed, carried the greater part of its waters to the Duk-i-Teer."

of the river. At the time of the Arab conquest, for instance, the river must, I think, have occupied the bed which passes by Záhidán, Kásimábád, and Burj-i-Afghán, for it certainly flowed to the west of Zaranj or Jellálábád, and at no great distance from that city, as the army having reached Zálik from the south without crossing the river, first touched it on their subsequent march to the capital, crossing, it is said, at the same time the canal of Karak, which probably watered the adjoining district of Karkúyeh.* I have laid down Rabí's march conjecturally on the Seistán map, and find that if Jellálábád marks the site of Zaranj, as seems to be almost certain, then the great canal of Síná-rúd, which was crossed between that city and Karnein, must be necessarily General Goldsmid's Helmend; and this agrees sufficiently well with the indication of the geographers that the Síná-rúd was the largest canal of Seistán, that it alone was navigable by boats, and that it passed within a farsakh of Zaranj.

When we examine, however, our next authority in point of time, Ibn Dusteh, who wrote in about A.H. 290, we find the name of Helmend applied to this same eastern arm of the river, which was previously called the Síná-rúd, the description indeed of the road from Jowein to Zaranj answering very accurately to the modern geography of the district as delineated by General Goldsmid. From Jowein the traveller thus passed by an easy stage to Kuring, the headquarters of the Seistán Khárijís, which I propose to identify with Peshawerán, as the ruins of that place contain the tomb of Mír Ikbál, who is said to have been a Khariji saint.† The next stage from Kuring ordinarily led by water for 12 miles to Hísanik across the inundations which connect the eastern and western lakes, and along the line of a canal, which seems to have been called in those days the *Serát*, or "road;" but there was an alternative land line which circled round the eastern lake, and crossed, firstly, the Níshk River, or Khásh-rúd; and secondly, the Helmend itself, six miles from

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* The reading in Beládheri is *Núk*, but Goëje, comparing all the authorities in 'Istakhrí,' p. 244, note *b*, decides in favour of *Kazak*, which, no doubt, was Yacút's reading of the name. I prefer *Karak* (leaving out the dot), as the canal must have flowed to *Karkúyeh*. It was, in fact, the last remaining water of the Helmend, and was crossed on the road from Zaranj to Herat, after passing Karkúyeh. I understand, therefore, in Beládheri's account that the Karak and the Helmend are, in fact, the same. Zálik has left no trace of its name, but must have been to the left of the road from Bunjar to Peshawerán.

† Ibn Dusteh says of *Kuring* that it was the native place of Ibn 'Aúf, the Rasesh-Sherát, or "head of the heretics;" and Yacút, who has however confounded the place with Karkúyeh, says that the inhabitants were all Khárijí weavers. The town was called *Kurinj* by the Arabs, and sometimes *Kurún* by the Seistánis, but I doubt if there is at present any trace of the name in the country.

Zaranj, probably at the spot now known as the Burj-i-Alamdár. Hisaník, which seems to have been ten or twelve miles from Zaranj, I compare doubtfully with the Aishkinik of Conolly, the low marshy tract into which the Khásh-rúd empties itself, and more certainly with the Hísún of the Arab campaign, which must have been to the north-east of Karkúyeh.* The date of Istakhrí, from whom all the other standard geographers servilely copied, was not more than ten or fifteen years after Ibn Dusteh; yet his description of the Helmend evidently applies to the left-hand rather than the right-hand branch of the river, either because he followed some earlier authority, or because the river had really resumed its old bed in the interval between A.H. 290 and 305. Istakhrí's narrative, which was reproduced with more or less exactitude, by Jyhání, Ibn-Haukal, Mokaddasí, Edrisí, and others, states that the first canal derived from the Helmend was the Te'ám, which ran up to the northward towards Níshk, *i. e.* the Khásh-rúd. It seems, therefore, to have followed the line of the Alamdár Canal of Conolly, and it fertilised such a large extent of territory in antiquity, that the south-eastern gate of Zaranj, leading to this grain district, was called the Báb-et-Te'ám.† There is some difficulty about the second canal, which was called the Násh-rúd; because, according to Istakhrí and his followers, it left the Helmend above the mouth of the Sená-rúd, whereas, according to the Arab march, the villages of Násh-rúd and Shírwádh, which must have been on the canal, were to the west of the Sená-rúd, and apparently not far from Zaranj or Jellálábád.‡ The third canal of Istakhrí, which was the great Sená-rúd itself, must be represented, as I have before said, by General Goldsmid's Helmend, the water in this canal having been pretty well exhausted in the irrigation of the districts around the capital, when the main

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* Yacút, summarizing the geography of Seistan from Beládheri's account of the original Arab conquest, says that the chief towns of the province were Zálik, Karkúyeh, *Hisúm*, Zaranj, and Rúsht, but the name had apparently passed away in the time of Istakhrí, as it is not included in his list, and never afterwards appears in history.

† *Teám* signifies "wheat" in Arabic, and the name seems to have been given to the canal on account of the large quantity of grain which was grown on the lands that it irrigated; the *Teám* gate being thus said to lead from the city to the "*rasátik*," or "producing districts," *par excellence*.

‡ It is by no means certain that the second canal of Istakhrí is the same as the *Násh-rúd* of the Arab campaign, though they were certainly in the same vicinity, and Goeje ('Istakhrí,' p. 243, note *m*) has compared the names. Goeje himself prefers the reading of *Bashter*, and follows Anderson in supposing the canal in question to penetrate as far as *Bashter*, one stage north of Peshawerán; but this is quite impossible (see 'Istakhrí,' p. 248, note *i*). The station beyond Karkúyeh, on the Herat road, I read as *Basher*, which I suppose to be the origin of Peshawerán. It must have been close to Kuring, and at least 50 miles from Násh-rúd.

body of the river flowed to the westward.* In fact, we must bear in mind that the canal and the river were liable to change places in antiquity, as they do at present; and that, although the normal distribution gave the name of Helmend to the western and of Sená-rúd to the eastern division, yet that the nomenclature was occasionally reversed, as in the time of Ibn Dusteh, when the main river occupied its present eastern bed. The fourth and fifth canals, called by Istakhrí the Sha'abeh and the Mílí, must have been the large streams of which one now passes between Bunjar and Nasserabád, and the other waters the districts of Dashtak and Chilling, and even penetrates as far as Si-koheh. Istakhrí's sixth canal is the Zálik, which must, I think, have left the river north of Burj-i-Afghán, and have passed to the extreme north-west limits of the cultivated ground, as Zálik was the first inhabited district which the Arabs reached marching from the south-west on Seistán. The remaining or seventh stream, containing the residue of the Helmend water and named by Istakhrí the Karak, watered no doubt the district of Karkúyeh, and is the same stream which was passed by the Arabs between Zálik and Zaranj, and was also crossed by a bridge on the high road from Zaranj to Herat, between Karkúyeh and Basher, the modern Peshawerán.†

I will now consider the old cities of Seistán, and endeavour to fix their modern representatives. Ptolemy notices the two capitals of Prophthasia to the north, and of Ariaspe or Agriaspe to the south, besides several smaller towns which are hardly worth inquiring into.‡ Prophthasia, which was a title imposed by the Greeks, is certainly Farrah, the native name of Φρά or Φράδα having been preserved by Isidore of Charax. Pliny says that it belonged to the tribe of Zariaspæ ("having yellow horses"), and this ethnic title is still perhaps retained by the neighbouring town of Sabzár, properly *Asp-zar.*§ The name of

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* Yacút, in his notice of the Sená-rúd, follows generally the account of Istakhrí, but confounds apparently the canal with the river, in adding, "what remains of the canal (after irrigating all the districts around Zaranj) flows into the bed of the Beni Karkar stream (the Karak of Istakhrí), where a dam has been constructed to prevent the residue of the water from falling into the Lake of Zireh." Hamdullah repeats the statement that the great canal from the Helmend which waters the town of Zaranj was the Sená-rúd, but it is doubtful if the name was really continued to his day (about A.D. 1330).

† The text of Istakhrí, with all necessary explanations, is given further on.

‡ These names, however, are evidently Arian rather than Turanian. Ruda (from *rúd*, a "river:" compare *Rúd-bár*), Arisada, Xarxiare, Pharazana, Nostana, or "the new town," of which *Nash*-rúd may be a relic, and Urana, may all be explained by Persian etymologies, though there are no similar names at present known in the country. Parin, also, of Isidore, which doubtless represented the capital of the province, is a complete puzzle.

§ See the quotations in 'Cellarins,' ii. p. 724, and compare Isidore in 'Min. Geograph.' and Stephen in voce Φράδα. Curiously enough, there are no traditions

Bagoas also, which Ptolemy gives to the northern hills, may be recognised in the districts of *Bak-wa*, of *Bag-ni* (Baghnein of the Arabs), and *Bag-rám*, between Farrah and the great range to the north.

Agriaspe, the southern capital, I propose to identify with Rám-shaharistán, and to place it at the spot marked as Rám-rúd, in Major Lovett's map. The account of this place by Istakhrí is as follows:—"It is said that the ancient capital of the province, in the time of the first Persian dynasty, was on the left of the road from Sejestán to Kermán, as you go to Dárek, opposite to Rásek,* at the distance of three stages from Zaranj, its foundations and many of its buildings remaining to the present day. The name of this city was Rám-shaharistán, and the canal of Sejestán flowed to it; but owing to the bursting of the dyke in the Helmend, the water of this canal was lowered and cut off from it, so that its prosperity diminished, and the inhabitants removed from it and built Zaranj."

At what exact period this catastrophe took place cannot be ascertained, but it must have been before the Mahomedan era, for when the Arabs invaded Seistán in A.H. 30, Zaranj was the capital of the province, and is described by the early writers as already a city of great extent and exceedingly populous. There was an inner and an outer city, the former containing five gates, and the latter thirteen, and the inhabitants were celebrated throughout all history for their extraordinary courage and endurance. Indeed, in the original Arab conquest, as well as in the wars of Chenghiz and Timúr, no city of Central Asia gave the invaders greater trouble than Zaranj, and it becomes therefore of some historic interest to determine its modern representative. The indications to this end are sufficiently numerous and of great weight: but, unfortunately, in some cases they are confusing, and in others contradictory. The distance of three easy stages, or about 45 miles, is given in two independent routes by Ibn Dusteh and Istakhrí, as the interval between Jowein and Zaranj, and this protraction points out the ruins of Jellálábád as the approximate site of the ancient capital; while the measurements of nine stages from Bost and of 80 farsakhs from Fohrij of Kermán are both sufficiently appropriate.† It occurs to

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connecting Farrah with the romantic history of Seistán, though the site is undoubtedly ancient. Ferrier, indeed, says that he found among the ruins of the citadel of Farrah, "bricks nearly 3 feet long and 4 inches thick, *with inscriptions on them in the cuneiform character.*" 'Caravan Journeys,' p. 393. Credat Judæus!

* In the itineraries Dárek is distant 2 stages from Zaranj on the road to Kermán, and Rásik is the fourth station on the same road. Compare 'Istakhrí,' p. 251, and 'Edrisí,' i. p. 431. The names are now apparently lost.

† General Goldsmid calculated the distance from Fohrij to Sikoheh roughly at

me also that the nomenclature of the gates corroborates the identification, and shows that the capital must have been at least as far north as Jellálábád, instead of, as has sometimes been surmised, in the southern portion of the province about Dashtek or Chilling; for the northern gate leading to Herat was called the Bab-Karkúyeh, from a town of that name, 3 farsakhs distant to the north; the eastern gate leading to Bost was called the Bab-Níshk (from the Níshk River or Khásh-rúd); and the south-eastern gate was called the Báb-et-Te'ám, from the Te'ám Canal, which, as already explained, must have left the river above the Band-i-Kohek, flowing northwards towards the Khásh-rúd.* The routes again, whether described by Beládherí, or Ibn Dusteh, or Istakhrí, are all consistent with this position, the only discrepancy indeed that I am aware of being the statement in Beládherí that Obád crossed the Sená-rúd from Zaranj, in order to reach the Jüí-kohneb, or old stream (that is, the bed of the Gershasp Canal), along which he marched to Rúd-bár, whereas in reality he, in passing from Jellálábád to the canal in question, must have crossed both the Sená-rúd and the Helmend.† A more serious difficulty, however, arises from the name which Christie gives to the ruins of Jellálábád. This traveller who rode across to the ruins, a distance of four miles from Burj-i-Alamdár (which must have been on the old Sená-rúd), had no doubt from their appearance and enormous extent (covering, he says, as large a space as the modern city of Ispahan, about 10 square miles), that they represented the site of the ancient city of

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225 to 230 miles. Jellálábád is about 30 miles further to the north, and the 80 farsakhs of Istakhrí at 3¼ miles to the farsakh, which is the usual rate of conversion, will be 360 miles, the two authorities thus exactly agreeing.

* Istakhrí is the original authority for the Zaranj gates, and he was followed by Ibn Haukal, Edrisí, and the other geographers. The two other inner gates which led southward to Fars and Kermán, were called the old and new. The 13 gates of the outer city, commencing from the south, and circling round by the east to the north, were as follows;—1. Míná; 2. Jurján; 3. Sízak (?); 4. Sarák; 5. Shu'íb; 6. Núkhík (?); 7. Alkám; 8. Níshk; 9. Karkúyeh; 10. Istrís; 11. Ghanjereh; 12. Nustán (compare 'Nostana' of Ptolemy-Yacút writes Nisnán); and 13. Rúd-gerán. The orthography of many of these names is doubtful, but the list is curious, as indicating the position of the various towns and villages which surrounded the capital. The great buildings in the city were—1st. The great mosque, at the southern or Fars gate of the inner town; 2nd. The court-house in the outer town, between the Te'ám and the Fars gates; 3rd. The prison in the inner town, near the mosque; 4th. Another court-house at the back of the mosque, near the prison; 5th. Between the Te'ám and the Fars gates, the palaces of Ya'cúk and of 'Amrú, sons of Leith; and 6th. Inside the city, between the Karkúyeh and the Níshk gates (that is, at the north-east angle of the city) the celebrated citadel called the *Ark*, in which was the treasury, built by 'Amrú, son of Leith. A description follows of the bazaars, mosques, hospitals, markets, interior canals, and reservoirs, &c., which it is hardly worth while to translate.

† A geographical summary of the Arab marches is given from Beládheri at the end of this paper, with a few explanatory notes.

Zaranj; but he adds that they were then known by the name of *Dooshákh*, and this name, as far as we know, was a title which never applied to Zaranj, although it did appertain to one, or perhaps two, cities in the vicinity. Dooshákh simply means "two horns," being the Persian translation of the Arabic Ḳarnein, but there is a strange confusion in the geographers as to the applicability of the title.* The city of Ḳarnein was the most celebrated in Seistán after Zaranj. It was traditionally the residence of Rustúm, and the capital of his kingdom, and some remarkable ruins in the vicinity were supposed to mark the site of his stable, being mentioned in the account of the original Arab conquest, and by all the later geographers. The city became afterwards especially famous as the native place of the four sons of Leith, who with their descendants, under the title of Suffárians, or "the Coppersmiths," dominated Persia for half a century between A.D. 800 and 900, and it would be interesting, therefore, to fix its exact site. The name, however, appears to be now entirely lost, and I can only approximately point out its position. Ḳarnein must have been near the Khásh-rúd, probably to the north of the river, about where Conolly remarked an old pillar in the district of Kaddeh, several places which are named in the immediate vicinity, admitting of positive identification, such as—firstly, the town of Khásh, distant from Ḳarnein one stage, or about 20 miles; secondly, the *Akhúr*, or "manger" of Rustúm, marked 65 in Conolly's map; thirdly, the fort of Níshk (duly laid down in Lovett's map), which formerly gave its name to the river (the Khásh-rúd) and the whole adjoining district; fourthly, Harúrí (64 of Conolly), the next stage to Suruwar, on the road from Zaranj to Bost; and fifthly, the passage of the river between Suruwar and Harúrí

* The identification of Karnein is of so much interest that I venture to translate all the passages regarding it *seriatim et verbatim*. Yacút, in voce Karnein, says:—"It is a village in the district of Níshk, in the province of Seistán. Ahmed Ibn Sahal el Balkhí reports that it is a small town with dependent villages and districts, one stage from Sejestán, to the left of the road leading to Bost, and distant 2 farsakhs from Suruwar. The Soffárians arose from this place," &c. Istakhrí and Ibn Haukal have the very same words that are quoted by Yacút from El Balkhí. The passage in Edrisí (where, however, Jaubert, with his usual carelessness, has read the name El-Fars) adds that "this place was formerly the abode of the hero Rustúm, and the seat of his government, and traces of his horses' mangers are still to be seen there." In the same way, Beládherí says, p. 394, that "Rabí crossed the Sená-rúd from Zaranj and came to Karnain, where the traces are to be seen of the manger of Rustúm's horse;" and Yacút repeats the last phrase (in voce Sejestán), where he summarises the geography of Beládherí, but without mentioning the name of Karnein. With regard to position, Istakhrí says that *Khásh* is one stage from Karnein, and a farsakh to the left of the road leading from Zaranj to Bost; also that Farrah is 2 stages from Karnein, the intermediate stage being Jizeh, which is 3 stages from Zaranj. The MSS., however, vary much as to these distances, and the numbers therefore are not much to be depended on. See 'Istakhri,' p. 252, note 6.

(65 of Conolly) in Istakhrí's route. As a further indication I may note that Ḳarnein was to the left of the road from Zaranj to Bost, at the distance of six or seven miles from Suruwar, the latter place being, perhaps, about Pinkisri, near the modern Chakhán-súr, with which name it may be connected, if, as I think almost certain, the old bed of the Khásh-rúd was considerably more to the south than at present.* Ḳarnein, as I have stated, means "the two horns," and the reason of this remarkable name is given at some length by Ḳasvíní, though by the strangest of jumbles he applies his description to an entirely different locality, namely Karkúyeh, which lies to the north, and not to the east of Zaranj. "Karkúyeh," we read in Ḳasvíní, "is an ancient city of Sejestán, where there are two lofty cupolas about a mile apart, and each surmounted by a horn, which resembles the horn of a bull. They are reported to belong to the age of Rustúm, and have remained from that time to the present as objects of wonder. And beneath the two cupolas is a fire-temple of the Magi, which would seem to show that the King had built near his dwelling-place a temple wherein he might worship. The fire of this Pyræum has never been extinguished, for the servitors who are told off to the duty of keeping up the flame sit down, at the distance of 20 cubits from the fire, and covering their mouth and breath, take with silver tongs bits of tamarisk-wood of the size of a span, and when the flame languishes and threatens to be extinguished, throw them upon the fire, stick after stick; and this Pyræum is one of the most celebrated of all the fire-temples of the Magi."

Now I cannot help suspecting that Ḳasvíní has here mixed up in one account the description of two distinct places. The palace of Rustúm, with its two-horned cupolas, must have been at Ḳarnein; but the great fire-temple of Seistán was at Karkúyeh, Yacút having a valuable notice to that effect in his 'Geographical Lexicon,' and Massúdi having also recorded that the third most ancient of the fire-temples of Persia was at Karakú,

* Chakhán-súr (or rather Chaghán-súr), the present capital of Afghan Seistán, is so named from a tradition of the marriage at this place of Gív to the daughter of Rustúm (*Súr*, "marriage," and *Chaghán*, old Persian for "a mound" or "*teppeh*," and often used in names of places). Conolly writes the name Chuknasoor, and Ferrier, still more corruptly, Sheikh Nasoor! Major Lovett found it to the south of the Khásh-rúd, though Conolly placed it to the north of the river, marking it as No. 24 in his sketch map. The river must, however, have changed its course at some period of history, running further to the south than at present; otherwise it is impossible to understand how the road from Zaranj to Bost could have crossed the river from north to south in the third stage between Suruwar and Harúrí, where Conolly, No. 61, marks the Goozari-Khásh, or "passage of the Khásh." Observe, however, that in the direct route of Ibn Dusteh, both the Khásh and the Helmend occupy the same beds as at present. I take the orthography of *Suruwar* from Yacút; Istakhri and his followers usually writing the name as *Siruzan*.

in Seistán,* which may also perhaps be the reading of a name given by Birúní to a town north of Zaranj.† Karkúyeh is laid down by Istakhrí in the route from Zaranj to Herat as the first stage from Seistán, distant 3 farsakhs, or about 10 miles, and the site therefore must be sought for among the extensive but nameless ruins which have been remarked by all travellers in that vicinity. (Compare Conolly's 45, 46, and 47.) Karkúyeh was also noted as being a great Kháriji settlement, and is thus confounded by Yacút with Kuring or Kurún, which was in reality 10 or 12 miles further to the north, forming a part probably of the extensive ruins which are more generally known under the name of Peshewerán.‡

With regard to Christie's name of Dooshákh, there can be no doubt but that it refers to the *two-horned* palace of Rustúm, and the title may possibly have been transplanted to Zaranj from Karnein after the ruin of the latter place; no such name, however, as far as I can ascertain, is known in the country at present, and it is not preserved in any historical or geographical work that I have seen, so that, pending further research, I must question Christie's authority for assigning the name of Dooshákh to the ruins of Jellálábád.

Of the other cities of Seistán there is not much to be said.

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* See 'Massoudi,' tom. iv. p. 73 and 462. The printed text has Karakerkan, but I prefer the variant reading of *Karakú* given in some of the MSS. Yacút's notice is to the following effect:—"Karkúyeh is a city in the province of Sejestán, where there is a fire-temple, most celebrated among the Majús" (Magi or Zoroastrians). Massoudi assigns the foundation of the temple to Bahman, son of Isfendiár, whose warlike exploits in Seistán are recounted by all the Persian traditionists, following the authority of the Seir-el-mulúk; but I have never found any other notice of his having built this particular Pyræum.

† Birúni's name, which occurs in the map No. 12, constructed by Sprenger on the authority of the Kanún for his Reiserouten, is perhaps to be read *Gowein* for Jowein, as a similar form occurs in Mokaddasi. See Istakhrí, p. 252, note *e*. But I think it more probable that the real form of the name is *Kurín*, which is the title given by Istakhrí and his followers to the district at the northern extremity of Lake Zireh, and which may thus be meant for Kuring or *Kurún*, a town situated amongst the present ruins of Peshawerán. The lake is always said by the geographers to extend for 30 farsakhs, about 100 miles, from *Kurín* north, on the road to Kohistán to the bridge of Kermán, south, on the road to Fars, this bridge being, according to Istakhrí, no bridge at all, but a *robát*, built by 'Amrú, son of Leith, about 4 stages south-west of Zaranj.

‡ The words of Yacút, in voce Kuring, are as follows:—"A small town, distant 3 farsakhs from the capital of Sejestán, the inhabitants of which are all Kharijí weavers. It is a pleasant and flourishing place, and by some people is called *Kurún*." From Kuring, according to Ibn Dusteh, the traveller to Zaranj passed by water for 4 farsakhs to Hisamk, and it must thus mark the northern extremity of the lake, exactly answering in this respect to the position of *Kurín*. Goeje suggests the reading of Gowein (equal to the Arabic Jowein) for the doubtful word in Mokaddasí, because Yacút says the people of Khorassan called their own town of Jowein *Gúyán;* but I have never heard of any such corruption of the Jowein of Seistan, which, indeed, is probably a pure Persian word derived from *Júí*, "stream."

Hisn-et-Ták, which after Ḳarnein and Karkúyeh was the chief of the district towns, I should place at Amíran, where there is still a very old minaret, as it is said to be at the back of one going from Zaranj to Khorassan, a stage distant from the former place, and nearly in a line with Ḳarnein.*

Of Hisún or Hísanik there is no record since the time of Ibn Dusteh, but it must have been to the north of Zaranj or Jelláłábád, on the skirts of the inundated land, called Aishkenik by Conolly, where extensive ruins are still to be seen.

The great difficulty, however, seems to be to find names for the numerous ruined cities, many of them of great extent and exhibiting signs of ancient strength and splendour, which are scattered over the face of the country. Ḳil'eh Fath and Púlikí, between Rúd-bár and the head of the delta, must have been places of great importance at some period of history; and there are remains of buildings at Nadali and at Záhidán, which probably date from the time of the Soffarians. I have never, however, succeeded in finding any detailed notice of the geography of Seistán since the fourth century of the Hejira. The standard writers of later times merely follow the old geographers, and local histories are, I believe, unknown. I will merely then add a few remarks on the ethnography of Seistán and the adjoining country, which is fully as interesting as the comparative geography.

There are at present three races in possession of the land,—Persians, Afghans, and Belúchis. The true Seistánis are Persians of the purest Arian type. In fact the only true representatives of the old Arian race probably to be found in Persia are the Seistánis, and the Jamshídís of Herát, the language, physical appearance, and general characteristics of the Persians of the Achæmenian period being better preserved in this outlying corner of the empire than in any other locality; and this is the more remarkable, as the region has a Turanian name, and was actually held at one time by a Turanian race. No doubt the traditional pride taken by the Seistánis in the exploits of Rustúm, who from a local became a national hero, has been mainly instrumental in preserving their purity of blood. The ruling family until very lately retained the title of Kaiání, claiming to descend from the Kaiánian or Achæmenian kings,† as the Mírs of Badakhshán lay

* The standard notice of Et-Ták, repeated by Istakhrí, Ibn Haukal, Yacút, &c., is simply that "it is a small city of Sejestán, at the back of one who travels from Zaranj to Khorassan; one of its districts supplies grapes to all the people of the province." It is also said in one passage to be a stage distant from Zaranj, and in another to be on the road from Zaranj to Kish (south-west of Candahar), at a distance of 5 farsakhs from the former place. It may be noted also that the place was destroyed by Timúr on his march from Zaranj to Bost. I take its position on the map from Birúni.

† The author of the 'Haft Aklíno,' who wrote at the end of the 16th century,

claim to descent from Alexander, and throughout the province almost every river, or remarkable physical object, is connected with some legend of the heroic days.* As the Kaiánís indeed of the present day refuse to contract alliances with Afgháns or Belúchis, so, probably, in the time of the Sacan occupation, did the native aristocracy stand aloof; and to a feeling, therefore, of national pride are we indebted for so remarkable a preservation of a pure ethnic type.

The Afgháns again are an Arian offset, but of a very degraded type, and showing a large admixture of foreign blood. Historical evidence and their own traditions show that, 800 years ago, the Afgháns were merely one of a multitude of tribes who inhabited the mountains which bound the Indus on the west. By degrees, however, they have imposed their name and language over the entire region stretching from Seistán to Cashmír, and have no doubt swallowed up a host of independent and more ancient nationalities. They have never obtained any general footing in Seistán, though detached Afghán colonists are here and there to be met with, and though politically they have of late years been paramount in the province.

It has been the object of the recent arbitration to draw a line of demarcation between the Persian and Afghán dependencies in Seistán, but it has been found impossible to suggest any frontier which shall combine geographical and ethnographical propriety with political rights; and, indeed, notwithstanding the skilful diplomacy and very meritorious exertions of Sir F. Goldsmid, it seems doubtful, after all, if the settlement which he has proposed, and which has been adopted for the present, will be permanently respected.

There are two other races, the Belúchís and Hazárehs, adjoining Seistán, whose ethnographical relations are a complete puzzle. The Belúchís, as far as physical characteristics are concerned, resemble Arabs much more nearly than either Persians, Turks, or Indians, and local tradition is unanimous in asserting that they crossed at the mouth of the Persian Gulf from the Arabian Peninsula into Mekrán;† but, on the other hand, it is neither

says that the governor of Seistán, in his day, was Malik Jellál-ed-dín, who claimed to be the hereditary representative of Kai Khusrú. It is from this chief, I believe, that the town of Jellálábád derives its name.

* Thus there are the forts of Zál and Sám, the canal of Gershasp; *Dak-i-tir*, so called from Rustúm's arrow; Chakhánsúr, so called from the marriage of his daughter; the manger of Rustúm's horse at Karnein; his dyke at Rúd-bár; his palace and fire-temple, according to Kasviní, at Karkuyeh, &c. Dr. Bellew, who accompanied General Pollock's mission, also found traditions of Kai-Khusrú and Kai-Kohúd attaching to ruins between Rúd-bár and Charburjak. (P. 207.)

† The Arabs name the original immigrants, who are supposed to have crossed over to Persia in the lifetime of the Prophet, Kufs, and they seem to consider the Belús as an independent tribe. Subsequently the two tribes became incorporated

possible that a small colony of immigrants should have thus spread over all south-eastern Persia, nor is there a trace of Arabic to be found in any of the Belúch dialects. I believe the ethnic type of the Belúchís to be that of the Eastern Æthiopians (or Cushites) of Herodotus, who were probably of the so-called Dravidian family; but during the twenty-three centuries that have since elapsed, they must have absorbed a vast number of indigenous or immigrant tribes,—Semites from the south-west, Arians from the north, and Turanians from the north-east and east. The great bulk of the Belúch nation now speak an old Persian patois, not very dissimilar to the Seistáni, but the Brahúís have an independent and most remarkable dialect, which has been shown to be of the Tamúl or Dravidian family, and which very possibly may be a remnant of the original Cushite dominion. There is, perhaps, no part of Asia over which a greater variety of tribes have spread than the modern Belúchistán, the overflow of the immigration, which streamed in from beyond the Oxus for 1000 years before and after the Christian era, having been forced down into this region in the line of least resistance; but I believe that at the present day no trace of any of the Turanian dialects which must once have prevailed here is now to be found in the desert country between Seistán, Kermán, and Sinde.

I must now say a few words on the Hazárehs, who occupy the mountains where once dwelt the Sacæ. The physiognomy of this race is distinctly Calmuck or Tartar, and they have even partially communicated their peculiar features to their neighbours the Afghán Ghilzyes; yet their language is good old Persian, and, as far as I have had an opportunity of judging, it is singularly free from any admixture with the Turkish. The question then arises—What is the real ethnic type, and are we to follow the physical or linguistic indication? Now I do not pretend to decide such a point authoritatively; but remembering, as I do, that this mountain region, though enclosed on every side by Arian races, is not included in the primitive scheme of Arian settlement, as given in the Vendidád, I hazard the conjecture that from time immemorial it was held by Turanian tribes, whose type of countenance still remains. For five centuries, at any rate, after Alexander—how much earlier we know not—the Sacæ or Massagetæ, or Sai and Greater Yuechi of the Chinese, were certainly in possession of the mountains, and about the time of the Mohammedan era we know of

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in one nation, called Ḳufṣ and Belús (or in Persian, Kúch and Belúch), and their habitat is described by Yacút *in voce* Ḳufṣ, almost within the same geographical limits which now apply to the Brahúís and Belúchís.

an extensive settlement, on the southern skirts of the range, of Turkish Khellej, while, later still, detachments of Mangú Khan's army are said to have been cantoned in the country, and to have given to it the name of Hazáreh. This latter derivation, which rests only on the authority of Abu-l-Fazl, I doubt extremely, thinking it more likely that Hazáreh is the translation of the Sacan *Min*, "a thousand," a name mentioned by Isidore in his notice of Sacastene; and I would further suggest that if any remnants of the army of Chenghiz Khán were settled in the mountains, they were the progenitors of the Moghul-speaking tribes, who still dwell in the hills of Ghúr, south-east of Herat; yet there is no denying that this constant influx of kindred blood from the east may have done much to confirm the Turanian type. The question, however, still remains—How and when did these Turanian mountaineers acquire the Persian language? My conjecture, then, is, that the Arian dominion commenced at the close of the third century of Christ, when the Sacæ were driven down to the Lower Helmend, and the Shár of Gharshistán became paramount ruler of the mountains.* At any rate, in early Arabic geography the names of places in the mountains, such as Kíf and Zúf, and Surmín and Beshír, are all Persian and not Turkish, and the Khellej are specified as a foreign Turkish tribe. The subject, however, is one of very great intricacy, and is chiefly of interest in the warning which it holds out to ethnologists, not to attach too much importance to language, but merely to consider that as one of the elements of inquiry in determining the ethnic relations of a tribe or people.

[EXTRACTS RELATING TO SEISTÁN.]

BELÁDHERI, p. 393. *Geographical Abstract.*

A detachment under Rabí was sent from Shirján of Kermán against Sejestán in A.H. 30. They first came to Fohrij, whence they crossed the desert, 75 farsakhs (230 miles), to a district called Zálik, 5 farsakhs from Sejestán. This place was attacked and plundered on the feast of Mehrjan (many stories about Zálik. See Yacút *in voce*). Then they came to a village called Karkúyeh, 5 miles from Zálik, which submitted without resistance. Afterwards they reached a district called Hísún, the people of which also remained quiet and submitted: then they returned to Zálik and took guides (?) for Zaranj, going on till they reached the Hindmend, and crossing a canal named Núk † (or probably Karak), which was filled from it, and then at last

* The name of Gharshistán is always said by Persian authors to be derived from *Gharsh*, signifying "a mountain" in the langnage of the country. Gharsh is of course the Zend *gairis* (Sans. *giri*), Gharshistán being thus allied to the old names of Kipin or Copben, and the Πραιτακήνη of Isidore.

† Yacút, who transferred all Beládheri's Geography to his own Lexicon, seems to have read this name as Kazak كزك, which form also occurs in some MSS. of

arriving at Rúsht, which was only a third of a mile from Zaranj. The inhabitants came out and fought a great battle, and inflicted some loss on the Moslems, but Rabí' turned again and fought till he conquered and drove the enemy back into the city. . . . . Then Rabí' went on to the village of Náshrúd, where he gained a victory, ... and afterwards passed on to Shírwádh,* which he also took ; . . . . and then, after killing great numbers of the people, he laid siege to the city of Zaranj, the Marzabán (or governor) of which, Abarwíz by name, at length yielded and was admitted to terms, giving as tribute 1000 slaves, each with a golden goblet. Rabí' then entered the city, and afterwards went on to the canal of Sená-rúd, and passed over it, and came to Karnein, where was the manger of the horse of Rustúm.† There he gained another victory, and then returned to Zaranj, where he remained two years.

Rabí' was succeeded by Ibn Samureh, who, after again conquering the Marzabán of Zaranj, and obliging him to pay a ransom of 1,000,000 dirhems and 1000 slaves, reduced all the country between Zaranj and Kish belonging to India, and also subdued the districts along the road to Arrokháj as far as the land of Dáwer; and on arriving at Dáwer he pursued the enemy into the hills of Az-Zor, where he subdued them and exacted a heavy ransom. Az-Zor is the name of a golden idol with rubies for eyes, and Ibn Samureh cut off its hand and took out the ruby eyes, saying to the Marzabán, "Take the gold and jewels: I merely wished to show you that this was a thing which could neither help nor harm one."‡ And he afterwards reduced Bost and Zabúl. * * * * * * * *

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'Obád Ibn Ziyád was sent against the frontiers of Sind from Sejestáu. First he came to the Sená-rúd, and then he took his road by the old stream (*Júí Kuhneh*) as far as Rúdbár of Sejestán on the Hindmend, and came to Kish, from whence he struck across the desert till he reached Kandahar. He slew

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Istakhrí, as the name of the bed containing the last remnant of the Helmend. If then we read كركك instead of كرك, we are able to connect the name with the adjoining town of Karkúyeh, and with the Κόρος of Isidore.

* The names of Náshrúd and Shírwádh are duly repeated by Yacút, but without any indication as to their position. They must, however, I think, have been near the capital, and between the Helmend and Sená-rúd.

† In the printed Beládheri this name is written *Karíyetein*, and M. de Goeje says the name must be different from that of *Karnein*, whence sprung the Soffarians ; but he could hardly have entertained this doubt if he had remembered that Edrísí distinctly placed Rustúm's manger at Karnein like Beládheri. Yacút had some doubt probably as to the name, and therefore left it out in his summary of the Arab campaign, though he mentioned the manger of Rustúm's horse. The ruins of this latter building are still to be seen at the present day.

‡ Dawér is the modern Zamín Dáwer, and the hills of Az-zor are the outer range of the Hazáréh plateau. Yacút names the idol both *Azzún* (*in voce* Dáwer), and *Az-zor*, in voce. I have no clue to the name of Az-zor, but it might belong to one of the Indo-Scythian gods of the period. If, however, *Az-Zún* be the true form of the name, meaning as it does in Assyrian, Hebrew, and Arabic, "an image" or "idol," it may be a mere translation of the vernacular *Baga*, "a god," which occurs in the Greek Βαγόας, applied to the mountains in question, as well as in the hill districts of *Bagni* and *Bagrám* above Zamín-Dáwer. *Baga*, "the god" (or Bhagwán), was afterwards used for any idol, as the name of *Buddha* in modern Persian became *But*. I have heard reports of the ruins of an old temple in the hills, north of Zamín-Dáwer, which may be the scene of 'Obád's iconoclastic zeal, though no European has visited the spot, Ferrier not having come further south than Zerni in Ghúr. The name of Dáwer, I compare with the *Zaori* of Nonnus, from whence came the *Záwul* or *Zábul* of romance.

the inhabitants and defeated them, and put them to flight after they had inflicted some loss on the Moslems. Here they observed the long caps (kelánis) of the natives. 'Obád established his government in the city, and called it 'Obádíyeh.

ISTAKHRI, p. 242 (compare Ibn Haukal, p. 300).

The largest river of this region is the Hindmend, which rises at the back of the country of Ghúr, and comes out on the borders of Ar-rokhaj (Arachotia) and the district of Dáwer. Then it goes on to Bost,* and finishes in Sejestán, where it falls into the lake of Zireh, and this lake of Zireh increases or diminishes in size according as a greater or less quantity of water falls into it. Its extreme length is about 30 farsakhs from the district of Kurín, on the road to Kohistán to the bridge of Kermán, on the road to Fars, and its breadth throughout is about the distance of one stage. Its water is sweet, and it produces fish in abundance, and reeds, and there are villages all round it except on the side which faces the desert. The Hindmend flows in one single bed from Bost until it arrives within one stage of Sejestán, where canals begin to be taken off from it. The first canal which is derived from the river is the Te'ám, which waters several districts till it arrives at the borders of Níshk. The second canal is the Nashrúd,† which also irrigates many districts. Then is taken off the Sená-rúd, which flows to within a farsakh of Sejestán (or Zaranj), and this is the stream on which boats ply from Bost to Sejestán when the river is in flood; for at that season only is the river practicable to boats, and all the streams of the city of Sejestán are derived from this canal of Sená-rúd. Then, as the Hindmend descends, the canal of Sha'abeh is taken off from it, which waters some 30 villages; and after that the canal of Míli branches off, which irrigates many districts. Lower down the canal of Zálik is also taken off, which furnishes water to a large tract of country; and what remains of the Hindmend goes on in a river-bed which is named the Karak;‡ and here there is a bund, or dam, to prevent the residue from falling into the Lake of Zireh, except in time of flood, for when that arrives the dam is of course broken down and the overflow falls into the lake. And on the Hindmend, at the gate of Bost, there is a bridge of boats, such as we see on the rivers of Irák. There also falls into the Lake of Zireh the overflow of the river of Farrah, and of the other streams of that region. The river of Farrah rises near Ghúr, and, after watering the region through which it passes, the residue falls into Lake Zireh; and the river of Nishk (Khásh-rúd) also rises near Ghúr, and, after irrigating various districts, a small portion of the overflow reaches Lake Zireh.

COMPARATIVE ROUTE from HERAT to SEJESTÁN (ZARANJ).

Istakhrí and Ibn Haukal.	Ibn Dusteh.
1. Herát.	1. Herat.
2. Jámán.	2. Kabak—running water.
3. The black mountain.	3. Sínún—aqueducts.

* The Bost of the Arabs is now called Kileh Bist, about 30 miles below the Girishk. The ruins are extensive, and there are still some fine architectural remains. Pliny, who calls it Beste, has preserved a tradition of its being first built by Semiramis, which merely indicates immemorial antiquity. In the Peutingerian map it is entered as "Bestia desellutta."

† The printed text of Istakhrí has *Bashter-rúd*, and the MSS. all vary, so that the form of Násh-rúd is not much to be depended on.

‡ The printed text has Kazak, which is the reading followed by Yacút, but I have already given my reasons for preferring Karak.

COMPARATIVE ROUTE from HERAT to SEJESTÁN (ZARANJ)—*continued.*

Istakhrí and Ibn Haukal.	Ibn Dusteh.
4. Aqueduct of Sari.	4. Khan-i-Jabir—wells and aqueducts.
5. Khashán of Isfezár.	5. Aqueduct of Sari.
6. Kúsár—enter Seistán territory.	6. Isfezár—a running stream.
7. Darah.	7. Kusár—aqueducts.
8. Farrah.	8. Kanís—aqueducts.
9. Bridge of the Farrah River.	9. Murghabán—aqueducts.
10. Siríshk.	10. Siríshk.
11. Kafkhan.	11. Kafkhan—aqueducts: the famous musical sandhill, a farsakh to the right of the road.*
12. Basint (?).	12. Farrah River.
13. Jowein.	13. Jowein: cross a river-bed with running water; the place is full of Khárijís.
14. Basher—pass on the way to Karkúyeh, by a bridge, the residue of the Helmend water.	14. Kuring or Kurinj—running water. Abú 'Aúf, the Kháriji leader, a native of this place.
4 farsakhs to	
15. Karkúyeh,	15. Hísaník.
3 farsakhs to	
16. Zaranj.	16. Zaranj.

"In passing from Kuring to Hísaník, if you are bound for the capital (Zaranj), and there is water in the Serát (the road), you are obliged to pass in a boat for 4 farsakhs to Hísaník, this being the regular track; but if you do not choose to take a boat, and prefer to pass from Jowein to the capital by the desert route to the left-hand, you need not cross any river or waters at all, except the river of Níshk; for you leave the Serát and the Hindmend to the right-hand and at a point below where you would come out from Hísaník, but 2 farsakhs before reaching the capital, you cross the Hindmend and another river called the Wadi Abras, and so go on to Sejestán."—*Ibn Dusteh MS.*

Route from Sejestán to Bost; from Istakhrí and Ibn Haukal:—

1. Zánbúk (a very doubtful name).
2. Suruwar, a large royal village (near Chakhán-súr).
3. Harúrí, a flourishing place; in this stage you cross the Níshk River by an arched bridge of brick. (Compare Hárrírí of Conolly, on the Khásh-rúd, and passage of river, *Guzar-i-Khásh.*)
4. Dehak; halt at the Robat; desert from here.
5. Robát Ab-i-shúr.
6. Robát Karudín.
7. Robát Kohistán.
8. Robát Abdullah.
9. Bost; all desert from the Robát-i-Dehak to within one farsakh of Bost.

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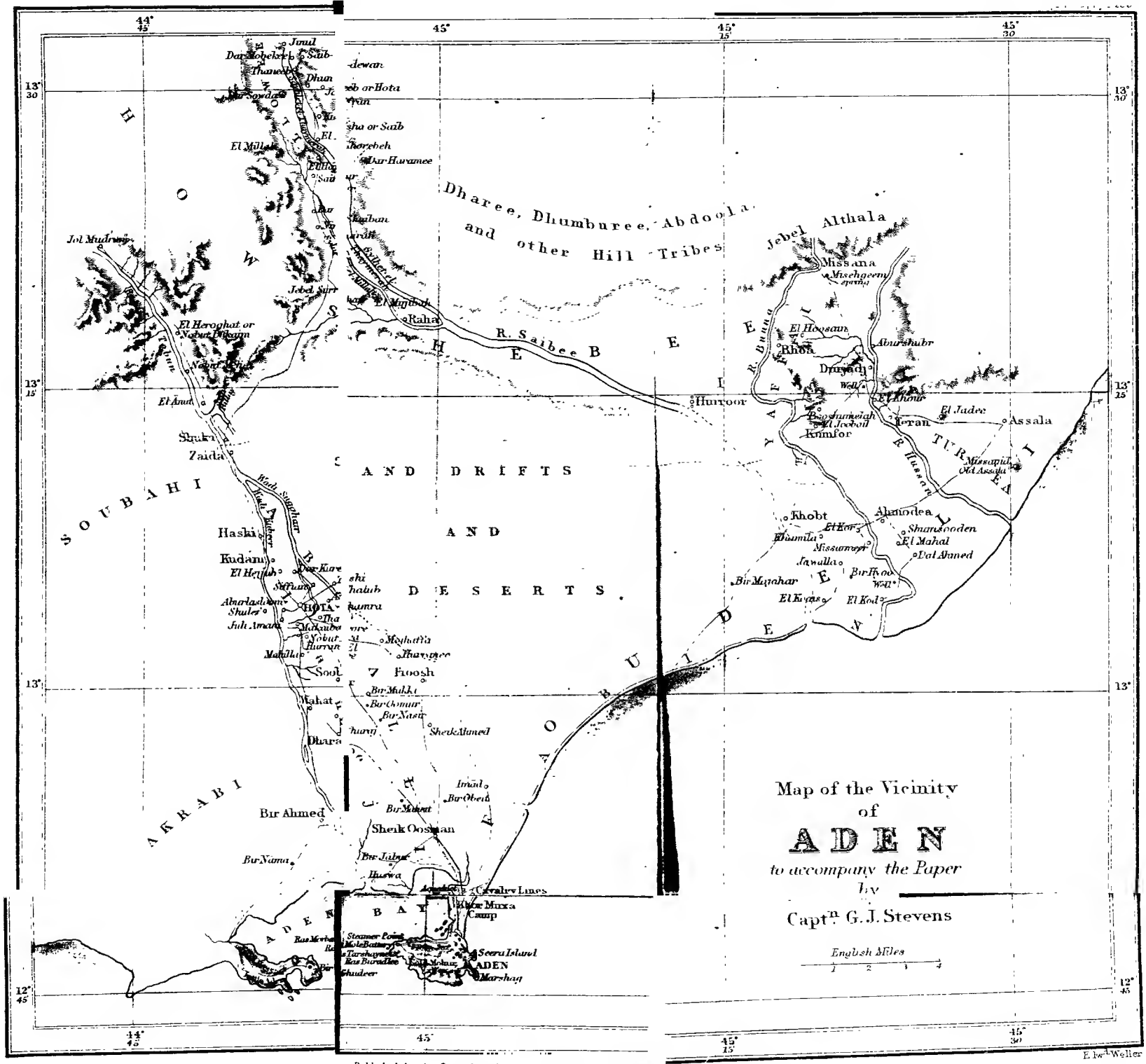
* The author of the Haft Aklim describes this natural phenomenon in detail, placing the scene at Kil'eh Káh, in the district of Aúk (modern Oke). General Goldsmid also visited the spot, which is like the Ríg-rewán at Kabúl, and the Jebel Nokáreh in the Sinaitic peninsula, and gives a good account of it in his official report. See also Bellew, p. 284.


Map of the Vicinity
of
ADEN
to accompany the Paper
by
Capt.n G. J. Stevens
English Miles
Dharee, Dhumburee, Abdoola
and other Hill Tribes
Jebel Althala
Mssana
Rhon
Hurroor
Iran
Assala
Khobt
Ahmodea
Haski
Kudam
Shuka
Zaida
Sool
Dhara
Bir Ahmed
Sheik Oosman
Cavalry Lines
Steamer Point
Seera Island
ADEN
Marshan
SOUBAHI
AKRABI
AND DRIFTS
AND
DESERTS
R. Saibee
Wadi Tuber
Wadi Sugghar
Wadi Hussan
Bir Mazahar
Bir Nama
Bir Ahmed
Sheik Alamed
Imad
Bir Obeid
Bir Nasir
Bir Mulki
Bir Jalna
Huswa
Moghatta
Fuosh
Jol Mudrum
El Heroghat or Nabat Dikann
El Hoosam
Abursbubr
Drugadi
Kimfor
El Jadee
Missapid
Old Assala
Shamsooden
El Mahal
Dal Ahmed
Jawalla
Bir Hood
El Kodi
El Kuas
El Kor
Bir Mazahar
Bay
Steamer Point
Mole Battery
Tarshyneh
Ras Burodlee
Ras Marbat
Shudeer
Marshan
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E. Weller

XIII.—*Report on the Country around Aden.* By Captain G. J. Stevens.

[Communicated by Major-General C. W. Tremenheere, Political Resident, Aden.]

On the 23rd November last, accompanied by Captain Ducat, R.E., I marched with 1 native officer and 49 men by the coast route to Khobt, a distance of 27 miles 5¾ furlongs.

The next day we proceeded to Kumfor, where I was much disappointed to find that Sooltan Ali bin Ahmed, under whose auspices I had hoped to pay a visit to El Gharra, the Yaffaee capital, had been called away on emergent business, and that, therefore, an onward move of any importance was out of the question. The following morning we made the ascent of a limestone hill, called El Joobail, close to the village, where we found the ruins of an old and extensive fort, said to have been built by the Turks. From this eminence the guide of the Quartermaster-General's Department, attached to the troop, was enabled to cut in Hurroor, Rhoa and other villages, which otherwise could not have been included in the map this year.

The day of our arrival at Kumfor I received a very kind letter from Sooltan Hydra the Foudeli, with whom I had communicated, welcoming me to his part of the country, and informing me that he had sent instructions to all his headmen to render me every assistance in the event of my caring to visit their villages. He also proposed that he should come down from his hill residence at Sooreea, some 50 miles off, to escort us in person, but this courteous offer I, of course, declined. I determined to take advantage, however, of his invitation, to see what I could of such parts of his territory as I had left unvisited last year; so, after halting a day at Kumfor, I moved on on the 27th November to Durjadj, a very thriving village 4 miles 4¾ furlongs north-east of Kumfor. We were very hospitably received here by Saif bin Teyseer, the sheikh of the place, and his brother Saleh.

The next morning, under the guidance of the latter, and with an escort of 20 sabres and a few of the Arab levy, Captain Ducat and I paid a visit to Missana, a small Syud village, 6 miles 6 furlongs distant to the N.N.W. of Durjadj, and situated at the foot of the range of hills called Althala, and at the spot where the "Bunna" finds egress into the plain. Above this point the river is mountain bound, and there being no arable ground on its banks, it is never interfered with by the few Bedoins who inhabit the hills lying in its course, but allowed to run without intermission throughout the year. We rode up it about 2 miles, and then returned to bivouac under the

shade of some trees near the village. Past this spot ran a little watercourse, which we naturally supposed had its origin in the river close by, but we were afterwards surprised to learn that it was a perennial spring. A walk to its source showed other channels similar to, but larger than, the one we had seen, and discharging a considerable volume of water. Captain Ducat, I believe, is of opinion that the spring is of artesian character. The water, as far as could be judged, seemed excellent. This spring, together with the land in its neighbourhood, is called "Misehgeem," and is the property of two brothers of the Jiffar family, to whom it has belonged for many generations. The name of one of them is Ali bin Ahmed bin "Jiffar," that of the other I have, I regret to say, forgotten. These people are too few and too poor to guard themselves and their property from the attacks of hostile tribes, so they pay tribute to, and place themselves under the protection of, now one, now another of the neighbouring chiefs, the result being that they are robbed and ill-treated by each in turn. At the present time they are supposed to live under the protection of the Sooltan of Mher, and one of the brothers resides in that place.

Some short distance up the river from Missana, the Foudeli are in the habit each year, with the consent of the Yaffaee chief, of constructing a bund, by which water is diverted for the irrigation of the country lying between Missana and the plain to the west of Teran, known as Turea. Were it not for this bund, the tract would mostly lie fallow, as, although in closer proximity to the River Hussan, it owes its fertility chiefly, if not wholly, to the Bunna. For the privilege of using this water the Foudeli pay the Yaffaee 100 dollars per annum. Formerly the charge was assessed at a mere nominal sum—about 25 dollars a-year—but the Yaffaee took advantage of the trouble that the Foudeli got into in 1866, to exact the present impost, and this conduct on their part has much embittered the relations between the two tribes. I must not forget to mention that during our short halt at Missana some of the Dharee tribe, living in the hills in the near neighbourhood of the place, hearing of our arrival, sent a deputation to wait on us. On entering the village, however, their hearts failed them, and they would not present themselves before us, but sent the head Syud of the village to prefer their request, which was that Government should no longer treat them as outlaws, but admit them into Aden in common with other tribes. They professed to be tired of their present lawless life, and made promises of future good behaviour.

In the evening we returned to Durjadj. The road between the two places is good. On leaving Durjadj, it lies for some

two and a half miles through fields, then over a tolerably level plain, covered with pebbles, until fields are again reached close to Missana. The hamlet of Aburshubr is passed a short distance to the right, a mile or so out of Durjadj.

On approaching Missana, a break in the hills is perceptible about two or three miles to the right front. Through this gorge lies the road to El Gharra. This town is said to be some 22 miles distant, to the N.N.E., from Missana. The road is described as very bad; no villages to be met with, and only occasionally a Bedoin's hut; nor do the scattered inhabitants of this region enjoy a very enviable reputation.

From a point on this road, between my camp and Missana, the Foudeli village of Mher was pointed out to me. It is situated farther up the valley than Missana, and under the hills to the right. There is only one Foudeli village higher up, called Nab. Of the country beyond I could obtain no information further than that it was wretched in the extreme, and inhabited by a Bedoin tribe called Oudheli. The inhabitants of this locality were the people who wounded the late Foudeli Sooltan, Ahmed bin Abdoola, and killed his younger brother, Mehtar bin Abdoola, consequently there is bitter feud between them and the Foudeli, and their road to Aden is thereby barred.

It had been my intention to visit the two villages above named, but I was deterred from doing so, on hearing that a fatal epidemic had been raging amongst the horses in that part of the country.

On the 28th of November I marched to Teran, 3 miles 3¾ furlongs, along a fair road through fields, passing El Khour, situated on a small isolated hill to our right, just before arrival at our destination.

Assala was the next march, a distance of 6 miles 6 furlongs. The road is good, for the most part over a plain almost devoid of vegetation. It runs through the hamlet of El Jadee, situated on a little eminence less than half way. Assala, a rather well-built and somewhat closely packed village of about 600 houses, is the largest in Abien, and represents the market-town of the district. It does not, however, seem to thrive in proportion to its size, and many of the houses destroyed by our force in 1866 remain as they were then left. There is no cultivation in the neighbourhood, and forage and supplies have to be brought from a distance. The water also is scanty. A number of traders from Hadramaut are settled here, and carry on, for so small a community, considerable business operations with Aden and the interior.

2 miles 3¼ furlongs S.S.E. of Assala there is a small collection

of huts called Misaijid. This, I believe, was the ancient Assala, once a thriving seaport. The establishment of a port at Shugra, as less exposed to attack by the Yaffaee, led to its being deserted, and it was then that the village or town above described was built and named after it Assala.

On the 1st of December I marched homewards, 9 miles to Ahmodea, and from thence the following day 6 miles 7¾ furlongs, in a south-westerly direction, to El Koais, a short distance from the sea. On this last march we passed the villages of El Khore, Missaimeer, and El Kod, also the ruined hamlet of Jawalla, where I halted to water my horses, the supply at El Koais being insufficient. This place, like many other localities in Abien, has been nearly deserted ever since the visit of our troops in 1866.

The Arabs seem averse to repair the buildings rendered uninhabitable by our Engineers on that occasion, but their restoration by Government, which could be effected at very trifling cost, would, I feel sure, be highly appreciated, and could not fail to have a most excellent effect. From El Koais I returned on the 5th December, to my Lines at Khor Muxa, a distance of 27 miles 5¾ furlongs, along the sea-shore. This route, if made use of when the tide serves, is excellent; but at other times most trying to horses, as the sand at high-water-mark is extremely heavy. There is, moreover, no escape there, from the country along the shore being a region of sand-drift.

This completed my trip to the westward.

Some weeks later, on the 9th January, I left Lahej, where I had been encamped some time, and proceeded, with 1 native officer and 55 men, to Shuka, the nearest point in the Howshebee territory, a distance of 11 miles 2 furlongs. On this occasion, I was accompanied by Captains Ducat and Chadwick, Royal Engineers, and Mockler, 5th Regiment N. L. I. Sooltan Ali bin Mana, the Howshebee chief, who had come to Lahej to meet me, followed us and escorted us the next day to Dar Shaiban, one of his villages, 15 miles 4 furlongs on the direct road to Saib, in the Allowee country, which was my destination, and some 5 miles from Raha, his own capital. Leaving Shuka, we had to cross the bed of a mountain torrent, then dry, called Sylhet Billay. On occasions of heavy rain in the hills, its waters flow as far down as Fioosh. A branch of this torrent also runs into the river Tobun, about a mile above Shuka. I should here mention that the river hitherto styled the Zaida River, is called the Tobun as far as the bifurcation below Zaida, whence the Huswa and Fioosh branches are known as the Wadi Kubeer and Wadi Sugghair respectively.

The Tobun is generally to be found running at Zaida, but this cannot be always depended upon.

After leaving the torrent bed above mentioned, our road lay for some seven miles over undulations of heavy sand, forming the north-western portion of the tract that separates the Foudeli from the Abdalli territory, and extends from the River Tobun to the sea. At the point that we crossed it, it is at its narrowest.

The next few miles of our march was between hills and over stony ground, frequently intersected by watercourses and dotted here and there with stunted trees and thin jungle, and then for some three miles or more up the dry bed of the River Saibee, to Dar Shaiban. The jungle hereabouts, more especially in the river-bed, is somewhat thick. Amongst other shrubs I noticed two or three varieties of cactus, which I do not remember to have seen growing wild before.

The Saibee takes its rise in the mountains beyond the Ameeri country, and is fed by innumerable mountain torrents in its course through the Allowee and Howshebee territories. When in flood, it waters the country about Hurrore and Khobt, reaching sometimes even so far as El Koais and El Mehjar in Abien. The village of El Mijibah lies on the right of the road to Dar Shaiban, and that of Nimarah to the left. Raha, the Howshebee capital, is situated about two miles south-west of El Mijibah. I did not make it my halting-place, as it is surrounded by jungle, and possesses no suitable encamping ground.

Dar Shaiban is a small village consisting of three mud buildings and several huts. There seemed to be a fair amount of cultivation in the neighbourhood.

Sooltan Ali bin Mana slept in our camp that night, and on the following morning attended us as far as the hamlet of Saifur, 1 mile 6½ furlongs, where he left us, promising to be there early on the morning of the 13th to escort us back again.

Skirting the Allowee village of El Hajur, where we were saluted by a fire of matchlocks, we arrived shortly at the village of El Khorebeh, and here we found Sheik Saif and his nephew Sheik Said, with a large gathering drawn up to receive us. After the usual formalities had been gone through, we all moved on under a salute of matchlocks, and preceded by a band of "tom-toms," to Kusha or Saib, the chief village of the place. Here a further ceremony awaited us in the shape of a military display.

The Allowee territory is situated in a fertile valley, and appears to be comprised in an area of some 20 square miles. Most of the land is capable of cultivation, though at the time of

our visit, owing to the late scarcity of rain, there were comparatively few standing crops. The villages are some seventeen in number. Most of them will be found in the new map accompanying this Report; but a few have unavoidably been left out, owing to want of leisure to visit them. This little territory seems better governed than any I have yet visited, and the inhabitants go about, within its limits, unarmed. We noticed several men wearing thick iron rings on the leg under the knee, and were informed that they were criminals, and that to such people rings of different degrees of severity are allotted, according to the measure of each offence. On my interceding for one of these men, to whom I had rather taken a fancy, the Sheik begged me not to press the matter, as the culprit had been guilty of a grave misdeed, that of having, in a fit of passion, drawn his dagger on a fellow-villager; and this, he added, was an offence which he never passed over lightly.

In the neighbourhood of Saib there are several villages built during the Turkish era, but now totally deserted and in ruins. Tradition has it that considerable treasure is buried in these ruins, and the children of the place turn out, after heavy falls of rain, to search in the torrent beds for anything that may be washed down from these deserted villages, which are situated chiefly on the summits or slopes of hills. I myself saw a gold coin which had been picked up in this way, and which was said to be of very ancient date.

On the 13th of January, taking leave of Sheik Saif, who had pressed us to stay longer, and professed much regret at our departure, and delivering to him the present sent by you, I marched for Shuka, a distance of 21 miles 3½ furlongs, by the road that we had come. Sooltan Ali bin Mana met us on the borders of his territory, and accompanied us the whole way.

Whilst at Saib, I received a visit from Raga Mowda, one of the Dharee chiefs, and two or three leading men of the Dhumburee tribe. They preferred a similar request to that made by the Dharees at Missana, but at the same time they expressed an undying hatred towards our ally the Sooltan of Lahej. This feud is owing to the Sooltan having ordered the head of a Dharee, killed in fight, to be cut off and exposed on the point of a spear.

On the 15th the officers before mentioned and I, escorted by some of my men, and attended by Sooltan Ali bin Mana, proceeded on an exploring expedition up the River Tobun.

Skirting its left bank and crossing the branch of the Sylhet Bilhay which runs into it, we arrived, at a distance of two miles, at the small village of El Anut, standing on rising ground to the left of the road. Just below this village, and situated on

a rock in the bed of the river, are the remains of a Turkish fort. We were much struck by the large size of the blocks of stone of which it is built, measuring, as some of them did, 11 feet × 2½ feet × 2 feet, and which, judging from the absence of any similar stone in the immediate vicinity, must at least have been conveyed from some little distance.

At about this point, with the exception of a few small crops grown in the bed of the river, near the different villages, for home consumption, cultivation ceases and the country begins to assume a sterile character. From El Anut the road lies for some few miles over a rocky plain, with here and there a few stunted bushes. The hamlet of Nobut Mehdi is passed at a distance of 2 miles from El Anut, and 2 miles 3¼ furlongs further on that of El Heroghat or Nobut Dukaim, both on the left of the road. A little beyond this the hills are entered, the river becomes much narrower, with higher banks, and signs of vegetation are almost if not entirely at an end.

From this point to Jol Mudrum, our destination, the space between the ranges of hills on either side of the valley scarcely exceeds a mile. Jol Mudrum is a small village situated on high ground on the left bank of the Tobun and 13 miles north-west of Shuka. Just before reaching it, we crossed a deep and somewhat impracticable ravine, its sides covered with boulders, and then descended into the bed of the river, and halted for two or three hours, in some fields of Indian corn, immediately below the village.

I was informed that the Howshebee limit, in the direction of our march that day, extends to a little beyond a very high wooded hill called Jebel Wurwa, some 25 miles distant from Jol Mudrum, and that the undermentioned hamlets, or villages, lie between the two places.

From Jol Mudrum to

Missaimeer	about	2	miles.
Akan	„	4	„
Hubeel Em Swader	„	2	„
Mishaighur	„	¾	„
Mureeb	„	¾	„
Missaimeer bin Obeid	„	3½	„
Mukedeem	„	2	„
Jaodoon	„	2	„
Hubbeel Mijjir	„	2	„
El Lijma	„	4½	„
El Kama	„	1½	„
Total distance	„	25	miles.

The peak of Jebel Wurwa, which was pointed out to me, can, at a great distance, be seen looming over the summit of other high ranges of hills in the foreground, and, if the above information, as to its remoteness, is correct, must, I think, be fully 3500 feet high. Sooltan Ali bin Mana promised to send in specimens of the wood growing there, but they have not yet reached me.

At 3 P.M. we started on our return to Shuka. The road between El Heroghat and Jol Mudrum can only be described as bad. This fact, and that of our having been over the same ground so recently, made our march homewards somewhat uninteresting.

That night Sooltan Ali bin Mana came to take leave of us, as he purposed proceeding to Raba early the following morning. He expressed himself much gratified at our visit and with the present you sent him, and said he hoped that on some future occasion he might have an opportunity of showing us much more of his country.

After halting two more days to enable Captains Ducat and Chadwick to carry out their investigations with regard to the river Tobun, I left Shuka on the 17th of January for Lahej, and the following morning marched into quarters at Khor Muxa.

I had hoped, later in the season, to make a reconnaissance of the road to Shugra, and the comparatively unknown country in that direction, and I much regret that the malarial fever which we contracted in the course of our late expedition, and which attacked nearly the whole of my men and myself, immediately on our return to the Lines, put an end to all further operations for this year. I trust, however, that what *has* been done may be productive of good results. I mean chiefly as regards intercourse with the Arabs. It is a source of much gratification to me to mention that their reception of us everywhere continues to be all that could be desired. In some places, especially those previously visited, it was most cordial, and I was much amused to see the villagers seeking out amongst my men old acquaintances and renewing friendships of last year.

I beg to enclose a Tabular Statement giving a description of the new localities visited this season.

LIST of PLACES in the INTERIOR of ARABIA unreported upon, visited by the HEADQUARTERS of the "ADEN TROOP" during the COLD SEASON of 1871-72, showing their RESOURCES, &c. (arranged in ALPHABETICAL ORDER).

Name of Place.	Description.	In what Territory.	Wells, their Number, the Quality and yield of Water.	Number of Dwellings.		Shops.	Supplies.	Distance from Neighbouring Places, and Remarks.
				Pukka.	Cutchs.			
Abursbubr ..	A hamlet on the left bank of the River Hussan, almost due N. of Durjadj.	Foudeli ..	One Well of good water, supply plentiful.	3	30	..	Ordinary supplies and forage plentiful.	Distance from Durjadj about a mile. Road fair, River Hussan has to be crossed. Headman Said Hussein Filaysi.
Assala	A large and compact village, standing in an open plain almost destitute of vegetation, and situated due W. of Teran.	Foudeli ..	Five Wells, water good, supply abundant.	600	20	15	Supplies of all sorts plentiful, forage procurable from a little distance.	Distance from Terau 6 miles and 6 furlongs; from Ahmodea 9 miles. Road to both places good.
Bir Ghudur ..	A well at the extreme E. point of Jebel Hussan.	British ..	Water brackish	..	..	..	None	Distance from the flagstaff at Jebel Hussan 2 miles 6¾ furlongs; from Bir Nama 10 miles 3¾ furlongs. Road good.
Bir Hyoo ..	Three mud buildings and a few huts nearly N.E. of El Koais.	Foudeli ..	One Well of good water, supply plentiful.	3	3	0	Forage in moderate quantities procurable in the neighbourhood.	Distance from El Koais 2 miles ½ furlong. Road good.
Bir Nama ..	A well and a hut in the desert due E. of Haswa.	Akrabi ..	Water good, supply limited.	..	..	..	None	Distance from Haswa 4 miles 3½ furlongs.

LIST of PLACES in the INTERIOR of ARABIA unreported upon, visited by HEADQUARTERS of "ADEN TROOP"—*continued.*

Name of Place.	Description.	In what Territory.	Wells, their Number, the Quality and Yield of Water.	Number of Dwellings.		Shops.	Supplies.	Distance from Neighbouring Places, and Remarks.
				Pukka.	Cutcha.			
Dal Ahmed ..	A good-sized village in the midst of cultivation, nearly N.E. of El Kod.	Foudeli ..	Two Wells of good water, supply plentiful.	1	40	0	Supplies and forage obtainable.	Distance from El Kod 3 miles ¾ furlong; from Ahmodea 3 miles ¼ furlong. Road good. Headman Abdulla bin Saleh.
Dar Haramoo	A hamlet in Saib	Allowi ..	One Well of sweet water.	7	0	0	..	About 2 miles E. of El Khorebeh.
Dar Mobekeo	A tower and a few huts on left bank of the Saibee, about ½ a mile from Saib-i-dewan, and to the west of it.	Allowi ..	One Well of good water, supply fair.	1	4	0	Provisions and forage obtainable in the near neighbourhood.	
Dar Shaiban ..	A small village, consisting of some mud buildings and a collection of huts on the right bank of the Saibee.	Houshebi ..	One Well of sweet water yielding an abundant supply.	6	20	0	Supplies and forage obtainable.	Distance from Shuka 15 miles 4 furlongs; from Raha about 5 miles. Road for 7 miles from Shuka very heavy, over sand drifts, for the next 5 miles fair, and the remainder along the bed of the Saibee indifferent. Headman Saleh bin Ahmed.

Dar Sowda ..	An isolated conical hill, with a fort at the top and a stone-built village at its base; situated on the right bank of the Saibee, and about 2 miles N.W. of Kusha.	Allowee ..	One Well of sweet water, supply abundant.	30	0	0	Supplies and forage plentiful.	Distance from Kusha about 2 miles. Road good.
Durjadj ..	A thriving village nearly N.E. of Kumfor, and situated in a fertile plain, and on the right bank of the River Hussan.	Foudeli ..	Three Wells, water good and abundant.	4	30	0	Supplies and forage plentiful.	Distance from Kumfor 4 miles 4¾ furlongs. From Missana 6 miles 6 furlongs. Road to both places good. Headman Saif bin Teyseer.
El Anut ..	A small village, situated on rising ground, close to and on the left bank of River Tobun, N.N.W. of Shuka.	Howshebee	Dependent on river for water, and at dry seasons on shallow wells dug in the river bed.	2	35	0	Forage scarce.	Distance from Shuka 2 miles. From Nobut Mehdi 2 miles. Road fair.
El Hajur ..	A stone-built village on the slope of a hill, on the borders of the Alloweo territory and on the right bank of the Saibee, nearly due N. of Dar Shaiban.	Allowee ..	One Well of good water, supply plentiful.	35	0	0	Forage and supplies plentiful.	Distance from Dar Shaiban 3 miles 4¾ furlongs. From Saib or Kusha 2 miles 2¾ furlongs. Road to both places a good deal cut up by water-courses.
El Heroghat or Nobut Dukaim.	A hamlet on left bank of the River Tobun, N.N.W. of Nobut Mehdi.	Howshebee	Dependent on river water, and in the dry seasons on shallow wells dug in the bed of the river.	1	20	0	None	Distance from Nobut Mehdi 2 miles 3¼ furlongs. From Jol Mudrum 6 miles 4¾ furlongs. Road to former fair, to the latter very bad.
El Hota or Dhuneeb.	A good-sized village on the left bank of the River Saibee, N.N.W. of Kusha.	Allowee ..	One Well, water good and plentiful.	35	0	0	Forage and provisions procurable.	Distance from Kusha 1 mile 6¼ furlongs. Road good.

LIST of PLACES in the INTERIOR of ARABIA unreported upon, visited by HEAD-QUARTERS of "ADEN TROOP"—*continued.*

Name of Place.	Description.	In what Territory.	Wells, their Number, the Quality and Yield of Water.	Number of Dwellings.		Shops.	Supplies.	Distance from Neighbouring Places, and Remarks.
				Pukka.	Cutcha.			
El Jadee ..	A hamlet on the road from Teran to Assala, and situated on a little hill.	Foudeli ..	One Well of good water.	3	20	0	Forage and supplies have to be brought from a little distance.	Distance from Teran 2 miles 6 furlongs. From Assala 4 miles. Road good. Headman Ali bin Lukhthur.
El Koais ..	A hamlet near the sea, about 2½ miles due w. of El Kod. Cultivation in the neighbourhood.	Foudeli ..	One Well of brackish water, supply limited.	1	10	0	Forage procurable.	Distance to Khor Muxa Lines 27 miles 5¾ furlongs. To Ahmodea 6 miles 7¾ furlongs. Road to Cavalry Lines excellent when the tide serves. Very bad at high water. Road to Ahmodea good. Headman Mahomed ba Ghazi.
El Kod	A good-sized village near the sea, and on the right bank of the river Bunna, due s. of Ahmodea.	Foudeli ..	A large supply of water obtainable from shallow wells dug in the dry bed of the adjacent river the Bunna.	20	20	0	Supplies scarce	Distance to Dal Ahmed 3 miles ¾ furlongs. Road fair. Headman Sooltan Abdulah bin Nassir.
El Khore ..	A walled village of some 20 mud houses in the midst of cultivation.	Foudeli ..	One Well of sweet water, yielding a fair supply.	20	0	0	Supplies and forage procurable.	Distance from Ahmodea 1 mile 4½ furlongs. From Missaimeer 6½ furlongs. Fair road.

El Khorebeh ..	A stone-built village on a hill in Saib. Cultivation around.	Allowee ..	One Well yielding a good supply of sweet water.	20	0	0	Supplies plentiful.	Distance from Kusha 1 mile 3¼ furlongs.
El Mahal ..	A good-sized village S.S.E. of Ahmedea. Cultivation all round.	Foudeli ..	One Well, water good and plentiful.	5	25	0	Ordinary provisions and forage plentiful.	Distance from Ahmedea 1 mile 5½ furlongs. Road good. Headman Salim Furwa.
El Mijibah ..	A fair-sized village, situated some 4 miles a little to the S. of S.E. from Dar Shaiban.	Howshebee	..	..	..	..	..	Headman Salim Awat.
El Millah ..	A village on a hill seen from the road to El Hajur, and situated nearly 2 miles west of it.	Howshebee						
Jafran	A nearly deserted village, about 5 furlongs E. of Hota or Dhuneeb.	Allowee ..	One Well, water good and plentiful.	8	0	0	None in the village, but procurable in the neighbourhood.	About 1 mile 5 furlongs from Kusha. Road good.
Jawalla	A deserted hamlet a short distance to the N.N.W. of Bir Hyoo.	Foudeli ..	One Well of indifferent water, yielding a fair supply.	..	..	..	None	Distance from Bir Hyoo 4¼ furlongs.
Jebel Hussan or Little Aden.	The promontory on the other side of Aden Harbour, opposite Ras Morbut and Ras Tarshein.	British ..	One Well of brackish water, supply limited.	..	..	..	None	From the flagstaff to the Cavalry Lines, Khor Muxa, 19 miles 6½ furlongs. Road good, except at very high tides.
Jinul	A village at the foot of an isolated hill, about N.N.W. of Kusha, and on the right bank of and close to the River Saibee.	Allowee ..	One Well of good water, supply plentiful.	19	0	0	Supplies and forage plentiful.	Distance from Kusha 4 miles 4¼ furlongs, from Saib-i-dewan 1 mile 1 furlong. Road good.

LIST of PLACES in the INTERIOR of ARABIA unreported upon, visited by HEAD-QUARTERS of "ADEN TROOP"—*continued.*

Name of Place.	Description.	In what Territory.	Wells, their Number, the Quality and Yield of Water.	Number of Dwellings. Pukka.	Number of Dwellings. Cutcha.	Shops.	Supplies.	Distance from Neighbouring Places, and Remarks.
Jol Mudrum ..	A small village on the left bank of the Tobun, and bearing rather N. of N.W. from Shuka.	Howshebee	River close by ..	3	30	0	Forage procurable in small quantities.	Distance from Shuka 13 miles. Headman Moonussur Mahsin.
Kusha or Saib	Chief village of the Allowee tribe. Its name is strictly speaking Kusha, but it is better known as Saib, the name of the district, just as the Abdalli town of Hota is invariably called Lahej.	Allowee ..	Two Wells of good water, supply limited.	60	0	0	Ordinary provisions and forage abundant.	Distance to Shuka 21 miles, 3½ furlongs. Headman Sheik Saif.
Misaijid (old Assala).	A collection of huts on the site of ancient Assala, about S.S.E. of the present Assala.	Foudeli ..	One Well of brackish water, supply scanty.	1	10	0	None	Distance from Assala 2 miles 3¼ furlongs.
Missaimoor ..	A hamlet consisting of one mud house and about a dozen huts to the N.E. of Jawalla.	Foudeli ..	One Well of indifferent water.	1	12	0	Forage procurable.	Distance from Jawalla 2 miles ¾ furlong, good road. Headman Mahamed bin Foudel.
Missana.. ..	A Syud village on the right bank of the Bunna and immediately under the range of hills called Jebel Althala, about 9½ miles N. of Kumfor, considerable cultivation.	Independent	River close by, also a spring of excellent water rather more than half a mile from the village.	15	25	0	Forage abundant, other supplies obtainable in small quantities.	Distance from Durjadj 6 miles 6 furlongs. To El Hoossein about 3 miles. Both roads good. Headman Syud Atash.

Nimrah ..	A hamlet lying on the left of the road just before reaching Dar Shaiban.	Howshebee	A Well of good water.					
Nobut Mehdi	A hamlet on the left bank of the Tobun, 2 miles N.N.W. of El Anut.	Howshebee	River close by ..	1	25	0	None	Distance from El Anut 2 miles. From El Heroghat 2 miles, 3¼ furlongs. Road fair. Headman Mehdi ba Husson.
Saib i-dewan	A village situated on the left bank of the Saibee, between 3 and 4 miles to the N.N.W. of Kusha. Cultivation in the neighbourhood.	Allowee ..	One Well of good water.	20	0	0	Forage and ordinary provisions of the country procurable.	Distance from Kusha 3 miles 4½ furlongs. Road good.
Saifur	A couple of mud houses and a well, between Dar Shaiban and El Hajur.	Howshebee	One Well of good water.	2	0	0	None	Distance from Dar Shaiban 1 mile 6½ furlongs. Road stony and bad.
Shumsooden ..	Three mud buildings and a few sheds to the N.N.E. of El Mahal.	Foudeli ..	One Well of good water, yields also good.	3	4	0	None	Distance from El Mahal 3½ furlongs.
Thaneeb ..	A village on left bank of river Saibee, about three quarters of a mile N.N.W. of Dhuneeb. Cultivation around.	Allowee ..	One Well, water good and plentiful.	25	0	0	Forage and supplies plentiful.	Distance from Kusha 2 miles 5½ furlongs. Road good.

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